The Builder.

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THE production in England of a large and elaborate work on classic art is so great a novelty at this time, that we hasten to welcome Mr. Penrose's "Investigation of the Principles of Athenian Architecture," which has just now been published. But for the Society of Dilettanti we should not have had this. It is not likely that any individuals would have incurred the necessary outlay with the certainty almost (we grieve to say it) of so limited a sale as would render loss inevitable. The Dilettanti Society, as most of our readers know, is composed of gentlemen devoted to art and antiquities. It is now in its 118th year, and consists of forty-two members, who dine together on the first Sunday in every month during the season. Walpole, speaking in 1743 of this club, in connection with the establishment of an opera, says, "the nominal qualification [to be a member] is having been in Italy, and the real one being drunk." We need not say this does not apply now. The two oldest members are the Duke of Somerset (1799), and Lord Northwick (1802); the two youngest are Mr. Broderip and the Marquis of Northampton (1851). It has assisted in the production of several fine works, and the book now before us is one of them. This is illustrated with numerous large engravings and vignettes, without regard to expense, which makes us more regret that so many pages of the letter-press, at all events in our copy, are "smudged," apparently through not being sufficiently dried before binding.

We shall confine ourselves on the present occasion to a brief exposition of the origin, object, and contents of the works.

In 1845 Mr. Penrose visited Athens, and remained there some months. In the spring of the following year, making reference to the ascertained fact that traces of the most refined thought and subtle optical principles were to be found in the Greek buildings of the best time, entirely overlooked by Stuart and Revett, and not adequately noticed in any later work, —he proposed to the trustees of the British Museum to provide himself with the requisite instruments of the best quality, and to give his services to the investigation of them free of all personal expenses (the results to be handed to the trustees for publication if they should think fit), provided he were sent out armed with their sanction and authority. He considered that it would require five or six months' work thoroughly to examine the Parthenon and the Temple of Theseus; that the expense in scaffolding and assistance would amount to about 50*l.*; and he said that he would be quite satisfied if her Majesty's minister were authorised to supply these expenses in furtherance of the work. The trustees felt that the undertaking proposed was foreign to their purpose, and were obliged to decline it. But one of the trustees, who was also secretary to the society of *dilettanti*, conveying the proposition to that body, it was immediately accepted, and thence the work in question. Its full title is, "An Investigation of the Principles of Athenian Architecture, or the Results of a recent Survey conducted chiefly with reference to the optical refinements exhibited in the construction of the ancient buildings at Athens. By Francis Cranmer Penrose, Architect, M.A."* It may be described in brief as a treatise "on the systematic deviations from ordinary rectilineal construction, found in the principal works of Greek architecture, which arise out of and pervade the entire design of the building." The aim proposed is, 1st, the establishment of the fact; 2ndly, the determination of the exact nature of these deviations; and, 3rdly, to aid in arriving at some knowledge of the theory on which they were made. Of the general character of the investigations on which this work is founded our readers are already informed, and if we give them an outline of the table of contents, they will be able to judge of the extent to which they have been carried out. Chapter 1 contains a general description of the Acropolis of Athens; 2 treats of the iconographic and orthographic proportions of the Parthenon; 3, of the discovery of the curvature of the horizontal lines in that building, and the jointing of the stones in Greek architecture generally; 4 speaks of the inclination of the columns; 5, of the Entasis; 6 gives details of the construction of the Parthenon; and 7 is on the curves of Athenian mouldings; 8 and 9 treat of the Polychromy of the Parthenon and the Propylæa; 10 gives a description of the latter building; 11 treats of the Theseum; 12 of the Temple of Jupiter Olympus; and 13, of the remains of an earlier Parthenon. The 14th and last is on the theory of the Optical Corrections adopted by the Greek architects.

We will mention that in the case of the Propylæa, the drawings from which the plates have been engraved—and very careful drawings they are—were prepared by Mr. T. J. Willson, who was the companion of the author in Athens.

Vitruvius is the earliest writer who alludes to the curvature of what are usually considered horizontal lines, and he points out that the stylobate (or substructure on which the columns rest) should rise gradually from the ends towards the centre ("as it would otherwise appear like the bed of a channel"), and that the capitals of the columns should not be placed in the same horizontal level, but should deviate from the straight line in proportion to the addition given to the centre of the stylobate.

The first notice of the fact in Athens was made in 1837, when Mr. John Pennethorne, an English architect, discovered the curvature, and afterwards published his observations in the shape of a pamphlet. The entasis, or swell in the upright lines of the columns of the Parthenon, was established by Professor Cockerell in 1810, and the inclination of the columns, by Professor Donaldson about 1829. It is singular how few of us *observe* even what we see!

"The flattest curve which has ever been applied to any architectural line for the confessed purpose of pleasing the eye is that, probably, which forms the entasis of the columns of the Erechtheum. In these, the amount of departure from a straight line, or to speak mathematically, the sagitta of the curve, is only ·0195 in 21·12, which is equivalent to ·108 in 100 feet. The value of the increment of curvature corresponding to the flank of the Parthenon is ·156 in 100 feet, so that the curve of the column of the Erechtheum,—a curve confessedly productive of the impression of beauty,—is scarcely more than two-thirds as great as that of the stylobate of the Parthenon; we cannot, therefore, deny that the curvature of the horizontal lines may produce some optical effect of beauty."

It is not unreasonable to suppose that those travellers who have wondered why the fronts of the Greek buildings were so much less "dry and hard" than our imitations of them, must have felt (however unconsciously) the beauty of the horizontal curvature. Without the entasis the outlines of columns seem concave instead of straight. It was applied so delicately, however, by the Greeks, that it is scarcely appreciable, except by its indirect effects. The Italian architects, of the Revival, magnified it very absurdly, making the diameter of the column at about one-third of its height actually larger than at the base. In no one of the Athenian examples, except Jupiter Olympius, is the profile of the column even perpendicular at the base,—the entasis is kept subordinate to the diminution. Mr. Penrose found the entasis in every case so nearly resembling one of the forms of the Conic Sections, viz., the hyperbola, that he is satisfied this was the curve used in the Athenian structures. The use of the hyperbolic or parabolic curves in the Greek mouldings produces a wonderful variety of light and shade.

The greatest amount of curvature in the horizontal lines of Greek structures was found in the new or Hecatompedon Parthenon, and in the Propylæa. In the latter, however, the curve only occurs in the entablature, the line of the steps being straight and level. The measurements are given in the two first columns of the following table; and if the length of the curved lines in the above-mentioned cases be all either increased or diminished, as the case may require, to an uniform length of 100 feet (the rise of the centre of the line always preserving its proportions to the length), the third column will give the relative amount of rise.

Buildings.	Actual length of the front or flank, measured.	Actual rise above a straight line joining the extremities.	Proportional rise corresponding to a length of 100 feet.
1. *Jupiter Olympius*—			
Front	354·2	·25 nearly	·07
2. *Sub-basement of the Parthenon*—			
Front	104·2	·150	·145
Flank	221·	·233	·105
3. *Theseum*—			
Front	45·	·063	·140
Flank	104·2	·101	·100
4. *Parthenon*—			
Front	101·3	·228=Flank × $\frac{1}{1000}$	·225=·145 / ·105 (very nearly)
Flank	228·1	·355	·156=·145 / ·105 (very nearly)
Entablature from eastern front	100·2	·171=$\frac{1}{2}$ ·288	·171
Ditto on flanks, restored	227·	·307	·135
5. *Propylæa*—			
Entablature from eastern portico	68·1	·119	·175

It will be seen from the above table that the curvature of the temple of Theseus is about the same as that of the earlier Parthenon; while in

* London: Longman and Co.; and John Murray.

the Periclean temple it is greater by one half. The effect of the curvature in the case of the temple of Theseus may have shown that an increase of curvature would be attended with advantage."

There is little doubt that some of the curves have resulted from accident; but that the curvature of horizontal lines was, nevertheless, a practice, seems established beyond a doubt. In some cases it was omitted. The temple at Bassæ, for example, although a work of the very best period, gives no indication of original curvature. Mr. Penrose explains this on the supposition that on account of its comparatively unfrequented situation it was not thought worth while to incur the additional expense necessarily attending it.

As to the reason for these deviations, our author thinks it difficult to imagine any other than that they were intended to correct certain influences which tended to make the apparent differ from the real form; and he is disposed to think that the want of each correction was felt and the correction applied separately. His opinion is that "the origin of the horizontal curve was to obviate a disagreeable effect produced by the contrast of the horizontal with the inclined lines of a flat pediment, causing the former (that is the cornice) to appear deflected from the angles." If we remember rightly, Dr. Emil Braun suggested that it was to make the lines harmonize with the sea horizon.

Our author concludes his work with some eloquent observations on the beauty of Grecian architecture, which he considers,—remembering "the studied harmony of the proportions, the delicacy of feeling evinced in the optical corrections, and the exquisite taste shown in the selection of the mouldings, and in the coloured ornaments so far as they are preserved to us; and, above all, the unrivalled sculpture, to which the architecture of the temple served as a glorious framework,"—is, humanly speaking, perfect. A greater range has been attempted in other styles, and successfully, but for consummate delicacy and judgment, the Greeks have had no equals. The study of their works is incumbent on all who would render themselves worthy the title of Architect.

Mr. Penrose's book is the result of most elaborate and careful investigations, guided by intelligence and sound scientific knowledge: it will find a place in every architectural library, and must be referred to by all who would thoroughly understand the principles of Grecian art.

ROYAL ACADEMY LECTURES ON ARCHITECTURE.

In Mr. Cockerell's third lecture, he proceeded, from the alphabet of the art, to consider its syntax, as laid down by Vitruvius, under the following heads:—1. Order, method, and regularity; 2. Fitness of arrangement, general disposition and contrivance, as adapted to locality and other circumstances; 3. Uniformity; 4. Proportion, being that relation of parts or quantities, by which harmony and grace are obtained; 5. Character, which dictates the special aspect of the work, according to its purpose; 6. Analogy, consisting in those resemblances and ideal significancies which assimilate the works of man to those of nature; and, 7. Economy, not only the vulgar economy of the purse, but that which combines utility with beauty, admitting nothing superfluous, and allowing nothing to be overlooked.

The first of these fundamental rules of architecture as a fine art, namely, *order*, is conspicuous in the individual productions of nature; from the daisy to the mammoth. It might be obscured by accidents of position, as in the case of a mob of people or a herd of wild horses; but if these were arranged in symmetrical form, as that of a regiment of soldiers, a general effect of order was produced, equally as in the individual. The principle of order, that serene tranquillity which ought to be the end and aim of all fine art, was especially enforced by Aristotle in its application to architecture. In the remains of Greek art it was conspicuous; whereas Michelangelo and his followers had sinned greatly against it in their picturesque style, which was in fact an unauthorized modern invention, arising out of the influence of the painter architects. The front of St. Peter's was particularly deficient in this respect. It would be seen by an elevation of it, that there were no two intercolumniations of equal width; besides which coupled columns were introduced, and the whole front cut up in a way which deprived it of all order and repose, and produced an unpleasant effect. In the design by Fontana for the same façade, the principle of order had been, on the contrary, well preserved. In the architecture of the Revival, broken pediments and architraves were constantly introduced: one pediment was placed within another; and many similar irregularities were committed,—the architects of that period forgetting that nature presented variety enough, and that architectural objects should be distinguished from those of nature by their greater exactness and regularity. It was right, however, to exempt the works of Raffaelle from this censure. As an architect, his designs were conformable to the spirit of the antique in their regard to order. Although a thorough master of the picturesque, he had reserved that quality for his pictures, and observed a rigorous order in his buildings. Palladio also merited the same degree of praise.

One method of attaining order, which had been successfully practised, was by an equidistant arrangement of windows and doors. This might be seen in Whitehall Chapel, where the main architectural features were irregular, but the windows equidistant. The same peculiarity might be noticed in the barracks in the Birdcage-walk.

Absolute order might be seen in a continuous balustrade, and within certain limits its effect was good; but sometimes absolute uniformity produced a mechanical effect, highly displeasing to the eye. To avoid this result, the Egyptians and the Gothic architects—while their columns and intercolumniations, were alike in general form and arrangement—varied the decoration of their capitals and bases to a very great extent. The same expedient was resorted to in the temple of Ephesus; and in one of the temples of Rome the capitals of the different columns contained a rebus of the names of the artists who executed them. Sir John Soane, in the National Debt Redemption Office, in the Old Jewry, had carried out the same principle, by using arches alternately of different sizes and elevations; and it was also shown in the works of a distinguished modern architect at Ghent. Julio Romano and his followers produced an admirable effect of order by the employment of decorated panels. There was, indeed, some justice in the reproach which had applied to English architects, who, in reproducing the temple of Jupiter Stator, and the other classic orders, and applying them to the most ordinary purposes, where an ornamented wall would be much more appropriate, had too often shown much poverty of invention. The exquisite mural paintings of Pompeii would furnish many useful lessons on this subject.

On the second head of Vitruvius—*diathesis*, or fitness of arrangement,—the architect's talent resembles that of the military general, who disposes his forces so as to conquer every difficulty. As surveyor to St. Paul's Cathedral the lecturer had frequently observed with admiration the skill of its distinguished architect in this respect: one instance especially he might refer to: the south-west windows of the edifice were hermetically sealed, while those to the north-east were ready to open, to admit the dry wind which would give durability to the structure.

In speaking of *symmetria* and *eurythmia*, the lecturer alluded to the confusion in their definition by Vitruvius, whose work was in that respect unsatisfactory,—probably owing to his deficiency of scholarship. The former of these terms might be defined as commensuration and parity of parts; a quality conspicuously displayed in the human figure. This symmetry was a characteristic and pleasing feature of the Great Exhibition building. Vitruvius spoke of decimal and duodecimal proportions among the ancients: a Roman temple had a dome in the form of a decagon; and it was possible that some such principles were acted upon. *Eurythmia* was that happy proportion and just harmony which produced an effect analogous to that of rhythm in poetry.

Under the fifth head, *character*, Vitruvius proceeded to define three varieties—the strong and robust, the slender and delicate, and that which formed a medium between the two; pointing out, in connection with the subject, the analogy of the Doric, Ionic, and Corinthian orders respectively, to the virile warmth of the mature man, the beauty of the matron, and that of the youthful damsel. It was evident, by the opening of the 3rd book of the Iliad, that the Greeks felt the dignity, beauty, and grace of these types of the human form; and set a high value upon each. The same classification of forms might be extended to the animal and vegetable creation, and even to geometrical forms; as in the cube, the parallelogram, and the cone; which each presented different qualities and merits.

The Greeks observed these different proportions, and although the theories of Palladio and his contemporaries did not advert to them, their practice did. Palladio, indeed, gave three different proportions of arches; one of a low or quadrate form, another of medium proportion, and a third being tall and lofty.

To show that all the dignity desirable could be obtained in a low, square composition, by a proper arrangement of its parts, the lecturer referred to Nottingham Castle, the house of the Duke of Newcastle, now in ruins. The width of the doors and windows in this building, and their distance from each other, served to compensate for the want of altitude, and imparted a high degree of dignity and magnificence to the design. The Church of St. Paul, Covent-garden, with its large intercolumniations, and square and massive effect throughout, was another illustration of this rule. It was also happily illustrated in the Cour de Garde of the Prussians, at Cologne, by Schinkel; whilst the vestibule of Buckingham Palace, about 100 feet by 50 feet, and only 15 feet high, was, on the contrary, injured in its effect by the employment of a Corinthian order,—which required a much loftier proportion. The equal beauty to be derived from low and lofty proportions, properly disposed, was further shown by drawings of the temple of Jupiter Capitolinus, restored by Canina, and the temple of Venus, a totally different design.

This quality of *character*, as well as the sixth quality, *economy*, and the seventh, *analogy*, were in some degree involved in the second head. The analogy of the human form with the proportions of the orders, has been already mentioned. Artists described works of art by the aid of natural similes; and in poetry the same analogy was continually felt and indicated. The slight allusion of Hamlet to the sepulchre of his father proved the analogy felt by the great poet of all time for an architectural monument; and the same analogy between poetry, nature, and arts, was displayed in the famous lines by which Viola describes her patient grief. The artist who did not likewise feel this analogy, was totally deficient in the first ingredients of his art. Joining in the poet's anathema against "the man who hath not music in his soul," he would emphatically say, "let no such man be trusted." Let no such man be trusted with the design and conduct of works which are to assume all the graces and dignity of art, and to challenge the approbation and criticism of native and foreign connoisseurs.

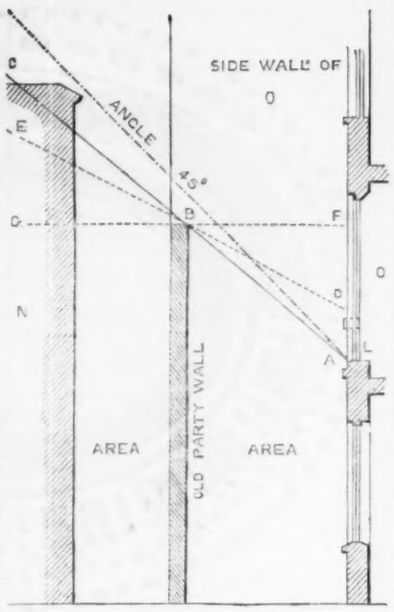
"PRIVILEGED LIGHTS."

THERE are few architects practising in this densely-housed metropolis who are insensible to the difficulties connected with "privileged lights," by which I mean those windows which exist and derive an essential amount of light from the property of the adjoining owner, and which, by an uninterrupted existence of twenty years, have obtained a prescriptive or privileged right to a continuance of the same; and the difficulty is aggravated by the absence of any legislative enactment on the subject, so that the architect is left to act on his unaided appreciation of the extent to which this acquired right is to ride over and control the buildings which he is instructed to place on the ground of his employer, and to incur the responsibility of occupying every desired inch of space to which he is entitled, without trenching on the "privileged light;" and an error of judgment, or even a difference of opinion with the owner of that light, may involve his employer in the vexatious and expensive proceedings of a Court of Law or Equity. It is manifest that this embarrassment could be greatly diminished, if not avoided, by a clause in the "Amended Buildings Act," setting forth a principle of adjustment and appointing a Court of Reference in case of difference of opinion as to its application. I think it probable her Majesty's Commissioners of Works might be induced to insert such a clause, if a principle were presented to them with the general concurrence of the Metropolitan architects; and it is with this view that I am desirous to avail myself of the medium of your journal for the discussion of the principle.

It would be uncandid not to state that I have been spurred to this by an award upsetting the theory on which I have hitherto based my proceedings, and as I propose to use the case out of which it arose as an exemplification of the theory, which I believe to be sound, I may be allowed to beg the gentlemen concerned therein to acquit me of all intention to say anything in the smallest degree offensive or derogatory to their excellent standing and high character.

My theory as to the extent to which a privileged light should prevail over the inherent rights of an adjoining owner is founded on the belief that light falls on and enters an opening or window at an angle of 45°; and, therefore, that if the new building does not project before or rise above that line of 45°, there is no deprivation of light to such window. In support of this theory I quote the schedule in the Metropolitan Buildings Act, which rules "that every street, alley, or mews hereafter built must be equal in width to the height of the buildings on either side," which is in effect the same as a line of 45° started from the junction of the buildings with the street or road. But the strongest argument I find in favour of this theory is, that it can be universally applied without leading to glaring absurdity or cruel injustice, and that is more than I can say for any other theory with which I have yet had the fortune to meet. In the case I have referred to, it was considered advisable to test the theory by an extreme case, which was put in this form: "Supposing a window to exist in a wall on the boundary of two properties, do you mean to contend that a roof springing from the sill, and rising at an angle of 45°, would not diminish the light in that window?" I answer: "Supposing the material of the roof be not such as by reflection to affect the quality of the light, I do believe that it would not lessen the amount of light transmitted by that window to an apartment." And it should be remembered that the person who depends on his neighbour's property instead of his own for light, is not a person for whom the law should be strained. We shall presently see where the principle of the award, if any may be inferred, will carry us, when applied under slightly different circumstances.

In the diagram subjoined the old house is denoted by the letter O, the new building by the letter N. The angle of 45° there shown is the line to which I claimed the right to carry the new building iwthout interference with the "privileged light," L.



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The umpire has awarded, "That the new buildings shall not be carried above the line, A B C, which line is to be drawn from the top of the wooden sill of the window, touching the inner top edge of the old party wall."

You will readily conceive my gratitude that the consequences are not more serious; for, if the sill of this window had been three feet above the floor, no uncommon case, the principle of the award which hinges on the "inner top edge" of the wall, would have swept away half the top story of my building, D B E; and to carry out this theory, the more nearly the sill of the window reached the level of the said wall, the more tremendous would be the effect on the adjoining property, and when *at* the level, away must go the whole of the story, F B G. I do not imagine that the gentleman in question would have made any such award, but I think this case goes far to prove the necessity of some established principle. There are many familiar illustrations that would assist to show soundness in my theory, but I do not feel justified in trespassing further on your courtesy, and they will readily present themselves to any person thinking earnestly on the point, and testing it by a variety of diagrams. In conclusion, I wish to observe, that I do not for one moment lay claim to this theory as original or peculiar: indeed, I know it is largely adopted by the most eminent members of my profession, and I confess I considered it so generally recognised amongst us, that I was free from fear when circumstances permitted me to comply with its rules; but now, alas!—in Celtic parlance—"I am landed in a sea of difficulties," and I shall be sincerely obliged to any one who will set me right, or lend a hand to procure an authoritative decision on this much-vexed question of "privileged lights."

C. F.

HYDRAULIC POWER AT SEA. — Mr. Seydell, naval architect at Stettin, and Mr. Ruthven, an English engineer, are said to have constructed a ship which is impelled neither by wind, oars, nor steam, but by retro-active hydraulic power.

"STEAM SUPERSEDED."—A new motive power is said to have been discovered or invented by Mr. J. Bourke, of Limerick, coach-maker. "The mechanism of the invention is quite simple, consisting of only 16 plain formed iron cranks, with six frames, which stand in the centre of the machine, inclining one towards the other. It can be erected upon two pair of wheels and two pair of springs, there being also 12 small wheels, or pulleys, with three levers, one bearing on the other, and by which it will be propelled."

GREEK AND ROMAN ARCHITECTURAL ANTIQUITIES.

AMPHITHEATRE—AQUEDUCT—TREASURY.

MAKING a second dive into Dr. Smith's depository of classical knowledge,* we fall on the word *Amphitheatrum*, and, with the certainty of telling some of our readers little more than they know, simply refreshing their memories, we nevertheless proceed to give a summary of the article.

The Amphitheatre, all know, was a building arranged for the purpose where were held the combats of the gladiators and wild beasts, representations of mimic sea-fights, &c. These exhibitions—peculiar to the Romans, and probably unknown to the Greeks, until introduced by that people—were originally made to take place in the Forum or the Circus; but this latter, being long and narrow, better adapted, in fact, for the chariot races, for which it was first designed; and the *spina*, a low wall, about 12 feet broad, and some 4 feet high, running almost the whole length of the arena, the *metæ* or goals at either extremity, offering a great impediment,—some new form of building was required, which should accommodate a multitude of spectators in such a manner that all might have a good view of the space occupied by the combatants; these shows, or slaughters rather, becoming in time the favourite amusement. The idea of such a building was suggested, as its name seems to imply, by the existing theatre (*ἀμφὶ* on both sides, *θέατρον* a theatre, a place for beholding). Indeed, the first amphitheatre of which we have any account—that of C. Scribonius Curio—was literally composed of two theatres placed on pivots, so that they could be turned back to back, forming two distinct structures for dramatic performances, or face to face, completing the amphitheatre. The erection of the next was effected by Julius Cæsar during his perpetual dictatorship, B.C. 46; and it was not till the fourth consulship of Augustus, B.C. 30, that a more durable amphitheatre of stone was erected by Statilius Taurus, in the Campus Martius (wood having been used for their construction, which some times proving inadequate to support the weight of the immense body of spectators, occasioned serious accidents; one, we are told of, built at Fidenæ, in the reign of Tiberius, gave way, burying in its ruins either 20,000 or 50,000 spectators). That Statilius's building was simply composed of stone, as far as regards the carcase only, and that the staircases and seats were of wood, seems highly probable, as in the burning of Rome, A.D. 64, it was destroyed. Caligula also commenced one near the Septa, but the work was not continued by Claudius; and Nero, too, in his second consulship, A.D. 57, erected a vast temporary building of wood.

The erection of an amphitheatre in the midst of Rome, proportioned to the magnitude of the city, was among the designs of Augustus; but it was not till the reigns of Vespasian and Titus that it was carried into effect by the erection of the Amphitheatrum Flavium, or, as it has been called since the time of Bede, the Colosseum, or Colisæum,—a name said to be derived from the Colossus of Nero, which stood close by.

This wonderful building, which for magnitude can only be compared to the Pyramids of Egypt, and which is perhaps the most striking monument at once of the material greatness and the moral degradation of Rome under the empire, was commenced by Vespasian, but at what time is uncertain, the date assigned by Lepsius, A.D. 77, being more than doubtful; and completed by Titus, who dedicated it, A.D. 80, when were slaughtered 5,000 animals of different kinds. There is an ecclesiastical tradition, but not entitled to much credit, that the architect of the Colosseum was a Christian, and afterwards a martyr, named Gaudentius, and that thousands of the captive Jews were employed on it. In the reign of Macrinus, on the day of the Vulcanalia, it was struck by lightning, by which the upper rows of benches were con-

* Dictionary of Greek and Roman Antiquities. Edited by William Smith, LL.D. Second edition. London: Taylor, Walton, and Maberly; and John Murray.

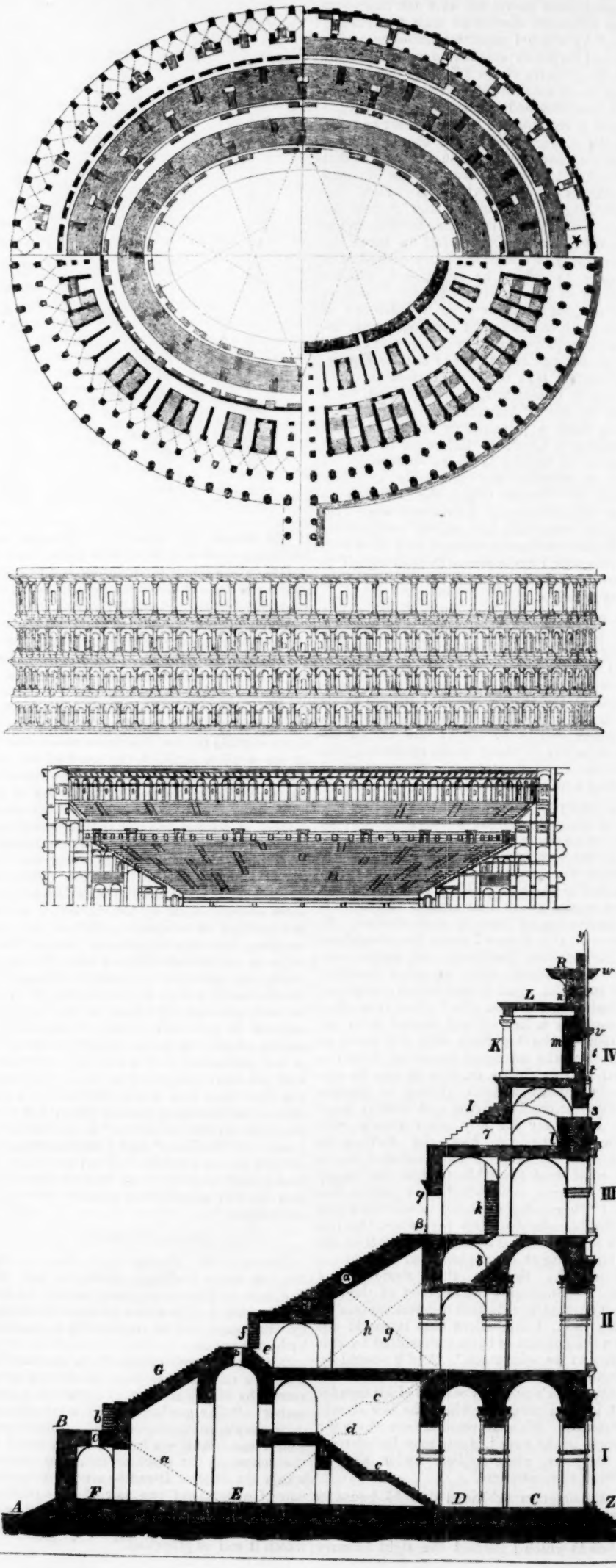
sumed, and so much damage done to other parts of the structure that the Games were for some years celebrated in the Stadium. Its restoration was commenced by Elagabalus and completed by Alexander Severus. It was again struck by lightning in the reign of Decius, but was soon restored, and the Games continued to be celebrated in it down to the sixth century; the latest recorded exhibition of wild beasts being in the reign of Theodoric. Since that time it has been used sometimes in war as a fortress, and in peace as a quarry, whole palaces, such as the Cancellaria and the Palazzo Farnese, having been built out of its spoils. At length the popes made efforts to preserve it, Sixtus V. attempting to use it as a woollen factory, and to convert the Arcades into shops; Clement XI. enclosed the lower Arcades, and in 1750 Benedict XIV. consecrated it to Christians who had been martyred in it.

Notwithstanding the damages of time, war, and spoliation, the Flavian Amphitheatre still remains complete enough to give us, excepting in some minor details, a fair idea of the structure and arrangement of this description of building. It was situated in the middle of the city, in the valley between the Cœlius, the Esquiline, and the Velia, on the marshy ground which was previously the pond of Nero's Palace. From mere dimensions we can form but an inadequate conception of this vast structure, the arrangements of which were such as to furnish seats for 87,000 spectators, round an arena large enough to afford space for the combat of several hundred animals at once, for the evolutions of mimic sea-fights, and for the exhibition of artificial forests; with passages and staircases to give ingress and egress to the immense mass of spectators, as well as others for the attendants on the arena; dens for the thousands of victims devoted to destruction; channels for the rapid influx and outlet of water when the arena was used for the Naumachia; and the means for the removal of the carcases, &c. Admirable pictures of the magnitude and magnificence of the amphitheatre and its spectacles are drawn in the "Essays" of Montaigne, and by Gibbon in his "Decline and Fall," to which we can but refer our readers.

The annexed ground-plan, external elevation, and section, are from Hirt, and contain, of course, some conjectural details. The ground-plan is so arranged as to exhibit in each of its quarters the plan of each of the stories: thus the lower right hand quarter shows the base ground-plan, or that of the lowest story; the next on the left shows a plan of the erections on the level of the second row of exterior columns, as well as the seats, which sloped down from that level to the lower one; the next quarter shows a similar plan of the third order; and the upper right hand quarter exhibits a view of the interior, as it would appear to an eye looking vertically down upon it. The dotted lines on the arena are the radii, and their points of intersection the centres, of the several arcs which make up the ellipses, of which form this structure, like all the other existing amphitheatres, is, covering nearly six acres of ground. The plan divides itself naturally into two concentric ellipses, of which the inner constituted the arena or space for the combats, while the ring between this and the outer circumference was occupied by the seats for the spectators. The lengths of the major and minor axes of these being respectively 287 feet by 180 feet, and 620 feet by 513. The stone used was a species of treventine: some of the blocks are as much as 5 feet high, and 8 or 10 feet long, fastened together where necessary with metal clamps: it is remarkable that all the stones forming the exterior have inscribed upon them small numbers or signs, either indicating the place of each in the building, and which, according to Dr. Smith, prove how great was the care taken to adapt every single stone to the form of the whole building, or may be simply "mason's marks," to which we have before now adverted.

The exterior needs little description; it is divided into four stories, corresponding to the tiers of corridors by which access was gained to the seats at different levels. These corri-

THE FLAVIAN AMPHITHEATRE.



dors are connected with the external air by eighty arched openings in each of the three lower stories. To the piers which divide these arches are attached three-quarter columns, presenting a continuous façade, in three stories, of eighty columns, backed by piers with eighty open arches between them, each tier being of a different order of architecture,—the lowest of plain Roman Doric, or, perhaps, rather Tuscan, the next Ionic, and the third Corinthian. The highest tier is of quite a different character, as it merely consists of a wall, without corridors, against which, instead of columns, are placed pilasters of the Corinthian order, and in the wall between them are windows, in the alternate intercolumniations only, and therefore, of course, forty in number. The whole is crowned with a bold entablature, pierced with holes above the brackets which supported the feet of the masts upon which the *velarium* or awning was extended, and above the entablature is a small attic. The total height of that part of the building which remains entire,—about three-eighths of the whole circumference,—is 157 feet; the stories being respectively about 30, 38, 38, and 44 feet high.

The internal arrangement can be best understood by referring to the section of the corridors, stairs, and seats :—

I. II. III. IV. The four stories of the exterior.
A The arena.
B The podium.
C, D, E, F The four corridors.
G, H, I The three mæniana.
K The upper gallery.
L The terrace over it.
R The space on the summit of the wall for the managers of the velarium.
Z The steps which surround the building on the outside.
a Stairs from the third colonnade to the podium.
b Short transverse steps from the podium to the first mænianum (compare the plan).
c, *d* Stairs from the ground story to the second; whence the second mænianum was reached in two ways, *e* and *g*.
e Steps to the first præcinctio, from which there were short transverse steps (*f*) to the second mænianum.
g Stairs leading direct from the corridors of the second story to the second mænianum, through the vomitorium *a*.
h Stairs leading from the floor of the second story to the small upper story, whence other stairs (*δ*) led to the third story, from which access was obtained to the upper part of the second mænianum by doors (*β*) in the upper wall in the second corridor, *q*.
k Stairs from the second story to the mezzanine, or middle story, whence access was obtained to the third mænianum by passages (*γ*).
l Stairs in the mezzanine, leading to the upper part of the third mænianum, and to the gallery, K.
m Steps from the gallery to the terrace over it.
n Steps from that terrace to the summit.
o, *p* Grated openings to light the two inner corridors.
q See under *h*.
s Windows to light the mezzanine.
t Windows of the gallery.
v Rest, and
w Loop, for the mast of the velarium, *g*.

Although, from the time of its erection, it was the only amphitheatre in Rome sufficing from its immense size for the entire population, there were several in the provincial towns—some built like the earlier ones of Rome itself of wood, and of which there are now, of course, no remains; but there are in many of the larger cities of the Roman empire important ruins of amphitheatres of stone, the principal of which being at Verona, Pæstum, Pompeii, and Capua in Italy; at Nimes, Arles, and Frejus in France; at Pola in Istria; at Syracuse, Catania, and some other cities in Sicily; but as they were mostly constructed after the Flavian model, farther mention would be unnecessary.

The means by which Rome and other cities of the empire were supplied with water we shall find described under the heading "Aquæductus:" of this structure the Greeks had probably little knowledge before the Roman conquest, although that there was amongst them at an early period powers of hydraulic engineering is shown by the drainage tunnels of the lake Copaïs,—and the similar works of Phæax at Agrigentum; and we have an instance, too, of a channel of water being carried through a mountain 900 Greek feet high, to supply the city of Samos, the length of the tunnel being 7 stadia, or about 1,420 yards. By the Greek regulations water might be fetched from the public fountains or wells to a distance of four stadia: beyond this persons were compelled to dig their own wells, but if any one dug to a depth of 60 Greek feet without finding water he was permitted to take from his neighbour's well six χοῦς (equal to about 36 pints) twice daily. The Romans were in a different position with respect to the supply of water from most of the Greek cities. They at first had recourse to the Tiber and to the wells sunk in the city; but the water obtained from those sources was very unwholesome, and must have proved insufficient from the growth of the population, to say nothing of the supplies afterwards required for the Naumachiæ and public baths. It was this necessity that led to the invention of aqueducts in order to bring pure water from a considerable distance, from the hills in fact which surround the Compagna. The writer properly scouts the notion that the Romans built aqueducts because they did not know that water finds its own level! The date of the first is assigned by Frontinus to the year 313 B.C., and was known as the *Aqua Appia*, being commenced by the Censor Appius Claudius Cœcus (to whom Rome also was indebted for her first great road), the number gradually increasing, partly by the munificence of individuals and partly at the public expense, till in the time of Procopius they amounted to fourteen: of these by far the most magnificent were the Aqua Claudia and the Anio Novus, both commenced by Caligula in A.D. 36, and finished by Claudius, A.D. 50, the length of the former was 46,406 passus (nearly 46½ miles), of which 9,567 were on arches. Of still greater length was the Anio Novus, it being the longest, nearly 59 miles (58,700 passus) and the highest, some of its arches being 109 feet high, of all the aqueducts. In the neighbourhood of the city these two were united, forming two channels on the same arches—the Claudia below, the Anio Novus above: an interesting monument connected with these aqueducts, is the gate now called Porta Maggiore, which was originally a magnificent double arch, by means of which the aqueduct was carried over the Via Labicana and the Via Prænestina. The Porta Labicana was blocked up by Honorius; but his barbarous constructions have lately been cleared away. Over the double arch are three inscriptions, which record the names of Claudius as the builder, and of Vespasian and Titus as their restorers. Great pains were taken by successive emperors to preserve and repair the aqueducts. From the Gothic wars they have, for the most part, shared the fate of the other great Roman works of architecture; their situation and purpose rendering them peculiarly exposed to injury in war; but still their remains form the most striking features of the Compagna, over which their lines of ruined arches, clothed with ivy and the wild fig-tree, radiate in various directions. Three of them still serve for their ancient use; and these three alone supply, according to Tournon, the modern city with a quantity of water much greater than that which is furnished to Paris by the Canal de l'Ourcy for a population six times as large.

As we have considered the means by which immense quantities of water were brought into the city, it may be as well for us to see to what purpose it was so extensively applied, or where was its grand outlet; this we shall, no doubt, find to have been in the *Baths*. It would be hopeless to attempt to arrange the information obtained from the writers on this subject,—Vitruvius, Lucian, Pliny the younger, Statius, and others—were it not for the help afforded us by the existence of extensive ruins of ancient baths, such as the Thermæ of Titus, Caracalla, and Diocletian, but above all of the public baths at Pompeii, excavated 1824 and 1825, and which were found to be a complete set, constructed in all their important parts upon rules very similar to those laid down by Vitruvius, and in such good preservation that many of the chambers were complete, even to the ceilings. Such was the estimation in which the bath was held by the Romans, that until their establishment for public use, we are told that those who sought the favour of the populace gave them a day's bathing, free of expense. Faustus, the son of Sulla, furnished warm baths and oil gratis to the people for one day; and Augustus, on one occasion, furnished warm baths and *barbers*, for the same period, and on another, for one whole year to the women as well as men.

In turning over the pages, we happen on the word *Thesaurus* (θησαυρός), a treasure-house, concerning the use of which there is some doubt. That buildings for the depositing of precious metals, arms, and other property were required, especially by kings and states, in the earliest period of civilization is evident; and tradition points to subterranean buildings in Greece, of unknown antiquity, and of peculiar formation, as having been erected during the heroic period for that purpose. Such are the treasures of Minyas, at Orchomenus, described by Pausanias, and of which some remains still exist; and those of Atreus and his sons, at Mycenæ, the chief one of which, the so-called treasury of Atreus, being still in almost a perfect state. But he concurs in our notion, that it is very questionable whether *these edifices* were treasuries at all, many of the best archæologists maintaining that they were tombs. The question cannot be entered into here; a full discussion of it, with the buildings themselves described, will be found in Müller, *Archäol d Kunst*, and in the *Rhein Mus.* for 1834 and 1838. In the historical times, the public treasury was either in a building attached to the *agora*, or in the *opisthodomus* of some temple.

With this we must close the volume, recommending it to the *general student*, as a perfect encyclopædia of ancient jurisprudence, manufacture, and of the religious, social, and military manners of the Greeks and Romans; and not simply, as he may perhaps be led to imagine from our sketch, purely architectural.

INFECTED ELEMENTS OF LONDON.

IN this country of fogs, during the winter season, for three months, a mantle of haze envelopes our plains, added to which the smoke of carbonaceous fuel, called sea-coal, thickening the vapour, invests with melancholy dulness both town and city.

Were it not for the paved superficies, London would be scarcely habitable, but owing to the non-absorbing surface of granite and flagging, the metropolis is, in point of health, not inferior to other towns, and at night-time, when the fires are for the most part extinct, the atmosphere is clear, and the stars may be numbered equally well as from levels of similar elevation.

If the drainage were perfect, as it might and ought to be, certainly no part of the United Kingdom could be more favourable to longevity than this industrial hive of two millions of souls. But it is, with sewage of a very imperfect nature, stagnant; and, giving back noxious effluvia even in some of the choicest localities, those advantages which might easily be assured by an uniform and regular outfall are wholly lost, the cleanliness above only moderating the baneful effect of the oozy pestilence below.

Many of the poorer streets, lanes, and courts are as yet wholly without outlets in them: the sullage is still hoarded in cesspools, and some terraces in the very best position in the same predicament, appear to evidence either the indolence of local authorities or the inadequacy of sanitary statutes to carry out the first requisite for health—good sewage.

The noble river that traverses the bills of mortality is notoriously a common sewer: it is every year becoming more fetid: it is wholly unfit for alimentary supply nearly up to Staines: it is intolerable as a medium of traffic, and has long since ceased to be resorted to by bathers and pleasure-boats, partly from the same cause.

Something should be done to mitigate this growing evil, and as nothing short of a total abduction of the polluting sources (*the sewers*) can remedy this, some of the plans propounded in THE BUILDER for *tunnels* or

sewers, bearing off the contamination to the Essex or Plumstead Marshes, must ere long be set about.

As I suggested some years back, and as many others have re-echoed very lately, such main ducts might be made useful as the foundation for rival causeways and quays, tending at once to the convenience of increased traffic, the beauty of the river, the inestimable advantage of tidal docks in the marginal reserves (as between Westminster and Waterloo-bridges), and above all, to the improved health of the whole population.

There is no necessity for a reach of mud-bank (a "*mare morto*") in a width of 200 feet at Whitehall, increased beyond the breadth of the river at Westminster or Blackfriars. It is true that the constant undulation caused by steam paddle-wheels has washed all the mud away, save at one point (the flaggers at Buckingham-stairs); but the constant agitation keeps the filth in solution; and as population increases, so the disgusting tribute thickens, befouls, and blackens the flood, until it has become so noxious that passengers by the boats avoid it on business, and so appalling is the baneful reek that parties of pleasure have long since migrated with the Thames Yacht Club beyond the Nore.

These facts are palpable and unmistakeable, and must lead to something like a conservancy of the Thames, in a sense more serviceable than corporate swan-hopping.

Next in order, though more serious in importance, is the *total revision* and regulation of the vital (or victual) water-supply. This is in many hands, and great is the company of the experimenters. Little has, however, been practically done; and probably until some other dire visitation impel the community, through fear of contagion, to make a combined and earnest effort, the supporters of Artesian wells, of gathering grounds, and other aqueous speculations, may continue to wrangle and amuse themselves—the citizens remaining content whilst trade prospers and debts only are *liquidated*.

More intimately in combination with the *air* of London the *smoke* acts on the constitution of the civic family: by night there is a partial immunity, save where tall chimneys vomit incessant volumes, begriming the fairest structures, and covering the furniture of inmost chambers with a sooty deposit. Why the Act of Parliament has not been carried out to redress this inconvenience seems strange, seeing that some manufacturing towns in the north have abated the nuisance, and that it is perfectly practicable.

The City, which is now but a limb of this commercial capital, has taken precedence in reforming the fuliginous plague: already our mornings are extended by a full half-hour, our evenings prolonged half an hour more, and the intervening day, unveiled of fog, is 20 per cent. more telling under sunny heaven. From and after the 1st of January, all opaque smoke is absolutely interdicted, and it will be found that the proprietors of factories, smelting-houses, and all establishments requiring large furnaces are gainers and not losers by the prohibition!

As the cost of the newly-applied principle of construction, as applied to coal combustion on a large scale, is found to be trifling, why, then, has not the Act been extended in its operation to the breweries, distilleries, soap, bone, oil, &c. &c. factories, which lift on high their towering shafts, and belch forth obnubilating vapours to the prejudice of health, the spoliation of architecture, and the abridgment of blessed day amongst the oppidans dwelling along the Thames from Greenwich to Battersea? or why are those externs ("*fuori le muraglia*") between Limehouse and Camden Town, and thence to Brentford, still unredressed? Nevertheless, the change, *quoad* the City, makes even to these suburbs a difference in length of day of an hour—in thickness of fog, two candles for a matutinal shave!

Water supply has been long a moot question. This matter has long been a grievance to the whole community; but, like the gas companies, supplying a bad commodity at high charge, the nuisance will enforce its own remedy and abatement: the water will find its level both in sewers and pipes. Old companies have improved their supply, and will yet go on amending; yet new ones *will spring* into life; the necessities of a growing population will demand, and will effect a reform.

So in sewage: what municipal care omits, the ravages of an epidemic enforces; what charity to crowded pauperism forgets, self-preservation puts in practice. The scientific have given plan after plan—tunnels, sumpts, engineering projects, *centripetal* borings,—nevertheless the system to be adopted, and that *will be* adopted, is simple, and, mayhap, easy, as the application of any new power in modern science. Governmental boards will not do it: they have tried it amongst them: they have given the problem for solution to public competition, but the end is not yet. Doubtless the intentions of all public bodies is good; but London is paved with good intentions.

How calamitous is it to reflect on the inadequacy of public boards! I forbear to name them, whether their walk be in the *woods* or on the *waters*. The Victualling Board is certainly not the Board of Health, nor the Admiralty the Irish Board of Control; yet imperfect as all human institutions are, it might be expected that great public works should be carried out in the richest city of earth, since we see such cities as New York and many of our English second-rate towns amply if not perfectly provided as to the requirements of *sewage* and *water*. Next to these the great desideratum is pure *air*: some may class the last first; and those who have admired the clean aspect of Paris and other continental towns,—who have breathed the light, exhilarating atmosphere of Brussels and other capitals even more northerly than our own, cannot fail to appreciate any invention as a blessing that should remove or lighten our own London particular fog. Mr. M'Kinnon laboured long to achieve the illustration of this newest of all London news: he was at first ridiculed, derided, bantered—nay, persecuted—but he still maintained his point, and may now affirm that "*it moves.*"

None can be more gratified by a progress of improvement in these particulars than the artists, builders, and architects of the day, for their works will reap the benefit in enhanced lustre, whilst the generation of the time will breathe, drink, and smell the purer media. Fancy London expurgated as to sewage, the river *disinfected*, the dull fleece of smoke dispersed, the blacks emancipated from Whitehall, throughout the circle of penny post and cab fares, the limpid gatherings from rainfall flowing fresh and free to every dwelling, the parks attired in nature's purest hues of leaf and blossom, people might become happy and content to live like John Gilpin "twice ten years" within the precincts, and cease to sigh for rural scenery, although enamoured of it as

QUONDAM.

NOTES IN THE PROVINCES.

Boston.—The restoration of St. Botolph's Church is proceeding under the superintendence of Mr. G. G. Place. The whole of the old pews are now levelled, and the excavations prior to laying down the new floor are progressing: the workmen will soon be able to commence the tower groining. The committee have intrusted the great east window to Messrs. O'Connor.

Essex Coast.—An extensive project of improvement is proposed to be brought before parliament, having for its object the embankment and reclamation from the sea of the vast green and samphire marshes, mudlands, flats, and shoals, on the eastern and southern coasts of Essex, together with the improvement of the rivers Colne and Blackwater. The subscription contract has been signed, we are told, for 162,000*l.*

Chelmsford.—The survey and map of Chelmsford made by the Board of Ordnance for the Board of Health, are completed. The map, which is in duplicate, one being on an extended, and the other on a reduced scale, is very minute, every house and its levels being shown. The cost will be about 400*l.* The local *Chronicle* says it is probable that a plan for the effectual drainage of the town will be carried out in the coming summer.

Ryde.—A plan of the esplanade from the clubhouse to the bottom of George-street connected with the pier approaches has been prepared. The cost has been estimated at about 5,000*l.* to be raised by subscription.

Brighton.—The inauguration of the extensive range of educational buildings known as the Brighton School, took place on Wednesday week. The dining-hall is 66 feet by 32 feet, and capable of dining 250 boys. In the dormitories, which are fourteen in number, the space allotted to each pupil is from 40 to 50 square feet. The corridors, which extend to nearly 300 feet in length, are covered with a glass roof.

Wells.—The works at the cathedral, after another long delay, are again in progress.

Bridgewater.—A painted glass window from a design by Mr. W. Brakspear is about to be presented to St. Mary's Church by the mayor, Mr. Thomas Ford. A circular window has been put up over the south porch by Mr. H. Salmon, a plumber and glazier in the town, at his own expense, and the same gentleman has been promoting a subscription towards the erection of another.

Cheltenham.—The *Gloucester Chronicle* states that there are now 350 houses untenanted in this town, and that the rents of those occupied have fallen at least 40 per cent., twenty-five of which have fallen within the last three years. It seems to be suffering from the effects of over-speculation in building, and in the dependance on the landed interest. Not many months since, a fine villa in the park, which cost 2,500*l.*, was sold by auction for under 1,000*l.*

Taunton.—The enlargement of the Archæological Museum is in contemplation, according to the local *Courier*. It has been proposed that the present entrance to the rooms on the ground-floor should be rendered available as a reading-room, whereby the upper range of the building might be appropriated to the purposes suggested. Messrs. Carver and Giles are preparing a plan and estimate of the probable cost.

Kidderminster.—The church of St. Mary is being re-pewed by Mr. Thompson, builder.

Colton.—The parish church of St. Mary, Colton, near Rugeley, was consecrated on 27th ult. The architect for the rebuilding was Mr. George E. Street. The new edifice consists of a chancel and aisle, nave, and two aisles, with porch. The old tower stands at the west end. The style is that of the 14th century. The glass in the windows has been executed by Wailes. The chancel is paved with Minton's tiles. The roof is of oak.

Birkenhead.—Messrs. Brassey and M'Cormack, the contractors, have undertaken to complete the Birkenhead Dock works on the original plans. It is understood that they will have for security a portion of the Dock Estate, and that the railway companies will guarantee the interest.—*Liverpool Albion.*

Manchester.—The chief stone of new overseers' offices has been laid in Fountain-street. Mr. Thomas Worthington, architect: Mr. Froggatt, builder. The new offices which will also be occupied by the churchwardens of Manchester, will be a three-story building of brick, with stone facings; comprising one large room on the ground-floor, arranged much like a bank, for the general clerks; on the first floor, a board-room, a waiting-room, and assistant overseer's office. On both these floors there will be fire-proof safes. The second floor will be the porter's dwelling. The cellars are to be arched and fire-proof.

Lancaster.—Mr. Thomas Ripley, of Liverpool, formerly a merchant in Lancaster, is about to build a school here, and endow it with 10,000*l.*

Skipton.—On 22nd ult. the first stone of the church of St. Mary, Skipton, was laid by the vicar. The new church is on a site given by Mr. James Sidgwick, the proprietor of the Kirk estate, and very near the probable site of the ancient church of St. Mary and St. Cuthbert, in Embsay, built A.D. 1123, but removed (1150) to Bolton. The funds for the erection of the new church were raised chiefly

by the late curate of Embsay, the Rev. C. Spackman; and the church is intended for a population exceeding 1,000. Mr. Shaw (of Leeds) is the architect.

Aldborough.—The standing orders have been complied with by the promoters of a measure for constructing a harbour of refuge at Aldborough, and to improve the drainage of the lands by the rivers Alde and Ore. The undertaking is proposed to be carried out by Town Commissioners. The estimate of Mr. Bruff, engineer, for constructing the harbour and works, is 60,000*l.*, and the probable amount of tolls and rates 5,000*l.*

Newcastle.—The committee of the Newcastle Mechanics' Institute, of which the late George Stephenson was a founder, and many years a member, have accepted our hint. They have convened a meeting of the members, to consider the propriety of procuring a building for their accommodation, to be called "The Stephenson Institute," and serve as "The Stephenson Monument."—*Gateshead Observer.*

Dundee.—The royal arch is now about to be handed over to the keeping of the harbour trustees. The architect, Mr. Rochead, and the builder, Mr. Harvie, have been paid, and other balances cleared off, and a plate alone remains to be engraved recording particulars.

Glasgow.—Early in 1850 a Smoke Committee was appointed by the authorities to vindicate the law. They have now appointed an inspector, and the war against smoke has commenced in earnest. All parties continuing to offend after 1st March are, it seems, to be proceeded against *en masse*.——Three plans have been submitted to the Police Board for improving the approach to the Infirmary and Cathedral. They were prepared by Mr. Brown, architect, and contemplate the depression of the mound of earth to a depth of 10 feet, thus excavating 10,000 square yards of rubbish, and opening up the foundations of the Old Bishop's Palace. The approach to the Infirmary would then be by two flights of steps, winding round in front of the entrance, and the sunk floor of the Infirmary would either be covered with a screen wall and parapet, or veneered as a basement story, having in front a low screen wall. ——Can anything, says the *Gazette*, be more barbarous than the manner in which many footpaths in Glasgow are covered with cinders, including great quantities of clinkers as large as brickbats? These are strewn over the footpaths, and left without any attempt being made to level or break them. Surely the authorities might afford a garden roller, to be passed over the surface, to smooth and consolidate it. George's-road is worth going to see, as a specimen of *intelligent* footpath mending.—— The trustees of the bridge over the Kelvin, at the end of Woodlands-road, intend to apply to Parliament for powers to erect a new bridge on the present site, and to improve and widen the approaches.——The annual meeting for the distribution of prizes to the students attending the Government School of Design was held on Tuesday in week before last,—Mr. Sheriff Alison, president of the institution, in the chair. Mr. Wilson, the head-master, read the report, which stated that the number of students who had attended since the vacation ending on 1st September last, exceeded all former experience. During November 476 students were entered on the books. The great majority are "pattern drawers" or artizans. The chairman mentioned that he would give a prize of five guineas for a subject to be chosen by the Committee of Management, and though he had had no communication either with the Lord Provost or Mr. S. Dalglish, he ventured in their names to offer similar amounts for prizes.

ARCHÆOLOGICAL DISCOVERIES AT LANTHONY PRIORY.—Some remains of the chapel have of late been found in excavating for a branch railway: two stone coffins have also been dug up.

RAILWAY AT HYTHE.—A public meeting was held at Hythe on Tuesday week to consider as to the adoption of a branch line of railway from the South-Eastern to Hythe. A report on the proposed route, drawn up by Mr. J. Messenger, was read at the meeting.

SIGHTS AND SCENERY.

Theatre Royal, Drury-lane.—Mr. Bunn has made great efforts to secure public support. On one night we have had the *début* of a whole body of new singers in "Robert the Devil," and all, to a certain extent, successful; on another, the re-appearance of the most refined actress on the English stage, Mrs. Theodore Martin, or, as she is still called, Miss Helen Faucit; and on a third, the advent of our best tenor, Mr. Sims Reeves, in "Fra Diavolo:" the latter piece is well got up, and has some very pretty scenery. In "Robert the Devil" the usual anachronism is shown in the scenery, a style of building being represented which did not arise till long after "Robert" died. This, however, did not interfere with the complete success of the performance. A new ballet is announced, in which the scenic artists will have an opportunity of showing what they can do.

Theatre Royal, Haymarket.—The scenes in Mr. Howard Glover's new opera "Aminta," painted by Messrs. Morris and O'Connor, are exceedingly good, especially the first and last. The first is a Spanish landscape of mountain and wood, studded with villas and campaniles; the other, a colonnaded court-yard, not far in character from the engraving we give in our present number of the arcade of the "General-life," near Granada. The music of the opera is pretty, rather than learned, and is very pleasingly sung by Miss Pyne, Mrs. Caulfield, Harrison, and Weis.

AMERICAN BUILDINGS.

FROM a compact and useful little book, called *The Boston Almanac for* 1852, we glean the following scraps of information:—

The Library of Harvard University.—Gore Hall, Cambridge, Boston, was begun in 1837 and finished in 1840. The building is in the Gothic style of the fourteenth century. It forms, in its plan, a Latin cross; the length of the body being 140 feet, and that of the transepts 81½ feet. The towers, buttresses, drip-stones, and all the parts which form projections, or the sides of openings, are finished with hammered Quincy granite; while the walls are rough, but laid in regular courses. The principal fronts are towards the south and the north, with octagonal towers 83 feet in height. The general design of the exterior is taken from that of King's College, Chapel, Cambridge, England. In the construction of Gore Hall, great care was used to guard it from destruction by fire in after ages. Wood was not used in the roof, except the boards or laths to which the slates are fastened. No timber was used in the main floor, which rests upon brick vaults, fitted to a level upon the spandrels; and wood was rejected in all parts of the building wherever stone, brick, or iron could be substituted with due regard to economy and permanency. The library at this time contains about 60,000 volumes. There are three other libraries or branches belonging to the University, making a general aggregate of 90,000 volumes. The entire cost of the building was 73,512 dols.

U. S. Armory, Springfield, Mass.—The main building is the new arsenal. This is 200 feet long by 70 feet in width, and 50 feet in height. This building is three stories high, and is sufficiently large for the storage of 100,000 muskets. The front is ornamented by a pediment 70 feet wide by 12 feet in depth. The tower is 89 feet high, and 29 feet square, above which the flagstaff rises 60 feet. Another prominent building, 400 feet long by 55 feet wide, and two stories high, is used for the storage of musket stocks and lumber. A sufficient supply of seasoned timber is kept for four years' manufacture of gun-stocks. On the hill are erected ten dwelling-houses, and six workshops, all owned by the government.

The M'Lean Asylum for the Insane.—This is a branch of the Massachusetts General Hospital. It was opened in October 1818. The asylum is located on one of the prominent hills in the new town of Somerville, about one mile north-west of Boston. 2,030 patients have been admitted during the fourteen years ending Dec. 31, 1850. Of this number 1,901 have been discharged from the institution; of these 1,026 had entirely recovered, and 644 had partially recovered. During the same period 227 died. At the close of the last year there were 200 patients remaining under treatment, while the average number for the year was 201. The lowest rate of board is 3 dols. per week. The expenses of the asylum for 1850 were 40,623 dols.—expended as follows: for stores, 17,627 dols.; wages, 6,173 dols.; salaries, 4,500 dols.; furniture and improvements, 10,310 dols.; diversions, 1,332 dols.; miscellaneous, 681 dols. The asylum has undergone considerable improvements during the past year. It has been recently furnished with two billiard tables for the use of the insane, and a conversation and reading room, where the inmates may daily meet for recreation and intercourse. The male boarders and female boarders have apartments in buildings entirely separated, and attended solely by persons of their own sex. A large portion of the inmates are sustained, and with all the essential advantages which any can enjoy, at rates much below the actual cost; while the calls upon the rich supply the deficiency between income and expenditure.

The State Lunatic Asylum, Worcester, Mass.—This building was partly erected in 1831 and 1832, under an Act of the Legislature. It was afterwards at various times enlarged, especially after 1842, when a large bequest by a Mr. Johonnot was realised. The present buildings have an entire front of 520 feet. There are five wings of 100 feet in length. The centre of the building is four stories high, with a front of 76 feet. The remainder are three stories high and 36 feet in width. The entire cost of the buildings, with the furniture and the several enlargements from time to time, was about 157,600 dols. The number of rooms provided for the use of patients in August 1851, was 386. There are forty-one rooms for other purposes. The entire number of patients at the same time was 472, viz., 239 males and 233 females.

The State Reform School, Westborough, Worcester County.—This institution, for the reformation of juvenile offenders, was established in 1846. It is intended for boys under sixteen, and will accommodate 300. In 1850-1, 331 have been at times within its walls. The school, in all its departments, bears no resemblance to *a prison*: the boys are led to forget the *past*, and to look forward with hope to the *future*. There are four grades in the school. When a boy enters the institution, he is placed in the third grade: if his conduct is not good, after admonition, he is degraded to the fourth, as a punishment. If he improve in his behaviour, he is promoted to the second grade; and should he continue to improve, he is promoted to the first grade, after a lapse of two months. There is also a subdivision of the first grade, known as the class of *Truth and Honour*, a degree which indicates the highest rank in the school. These grades do not refer to intellectual progress, but are confined to the moral standing of the inmates, and apply to their conduct in the schoolroom, in the workshop, on the playground, or the farm. The expenses of the institution for 1849 were 29,991 dols., and for 1850, 29,261 dols. This sum is larger than it will be hereafter, because several thousand dollars were expended in buildings, improvements, &c., which will not be repeated. The average expenses of each boy at the school are about 34 dols. per annum; while the average cost of the inmates of eleven different state prisons is 67 dols. per annum. Westborough is near the Boston and Worcester Railroad, about 32 miles from Boston.

THE ARTISTS' CONVERSAZIONE.—The first of the meetings under this name, for the present season, was held on the 31st ult., at the Freemasons' Tavern, when, as usual, there was an interesting collection of works of art. The second is fixed for the 28th inst.

AN APOTHEGM.

THE Architect, who raises in the air
Enormous structures, massive, grand, and fair,
Leaves to the world the genius of his mind,
And is a benefactor of mankind!

ANDREW PARK.

WARMING RAILWAY CARRIAGES.

It appears that the Great Northern Railway Company have commenced to warm their carriages on the "through" trains by the introduction of "foot-warmers." This is a start in the right direction; and, what is more, it is truly the beginning of a system which must become general on every railway throughout the three kingdoms. There is no practical difficulty to be overcome in making a railway carriage warm and perfectly comfortable; so that the most delicate person may travel from "Land's-end to John o' Groats" as snugly and cosily as if he had his feet on the hearth-rug of his drawing-room, with the curtains drawn and a warm fire in the grate. It is now upwards of six years since I detailed a plan for the accomplishment of this, and brought it before the public through the columns of the *Liverpool Journal*. The article was extracted by more than one metropolitan journal, and was commented on pretty generally, but nothing came of it. Railway directors, in the days of their prosperity, were not prone to patronise the schemes of an outsider, especially where there would be a little extra trouble to the officials, much comfort to the passengers, but probably no more pay, the full toll being already exacted. A little wholesome competition will, however accomplish wonders; and we shall not be obliged to pay the terrible penalty of being half-frozen through a long journey, when it is proved to demonstration that at a very slight extra cost to the companies, we may be carried swiftly, safely, and warmly. Robert Rawlinson.

P.S.—The warming-feat (qy. *feet*) has long been accomplished in the swift boats on English and Scotch canals, as also on American and continental railways.

LECTURE ON MACHINES AND TOOLS, FOR WORKING IN METAL, WOOD, AND OTHER MATERIALS.

In continuation of the course of lectures on the results of the Great Exhibition at the Society of Arts, Professor Willis, on the 28th ult., delivered a lecture "On Machines and Tools." He observed that whilst the departments of raw material and products in the Exhibition were copiously illustrated, and generally understood and appreciated, that of actual processes was not at all well represented, and still less were the objects displayed, understood, or admired by the myriads who thronged the building. Much distrust at present existed between the scientific man and the practical mechanic; and for this each was to blame. Self-taught and ingenious men were too apt to despise the advantages of scientific knowledge, and to hold themselves above all teaching; and with a degree of presumption which brought its own punishment, they attempted the construction of complicated machines, for the conception of which they might possess a natural gift; whereas, without scientific knowledge they might fail in combining the different motions required, or produce ultimately something which had been done long before. Scientific men, on the other hand, too often forgot the proper mode of addressing their advice and instruction to mechanics; and by a want of judgment in the selection of their illustrations, excited a prejudice which it was difficult to counteract.

There were three principal modes of working raw materials into shape; by cutting off their superfluous masses, in chips or large pieces (and to this mode time would compel him to limit his observations); by moulding or kneading the ductile; and by casting the fusible materials. The turning-lathe was one of the most ancient and simple machines applied to the former purpose. The lecturer described its operation in scientific terms, and proceeded to notice the history of machinery, in reference to some of the more important inventions. The watchmakers were among the earliest inventors of shaping-machines, in proof of which he referred to the tools they used for forming the toothed wheels of clocks and watches, and to the fusee-engine, an instrument of great ingenuity. He stated, that the first complete set of shaping-machines for the manufacture of goods in metal, were those introduced for the construction of Bramah's locks. He noticed also the famous block-machinery at Portsmouth; and in reference to the adoption of cast-iron instead of brass for astronomical instruments, he argued that the makers of such instruments must necessarily understand the use of various machines for boring, slotting, &c. which they had hitherto been unacquainted with. This general knowledge was of the greatest consequence.

The Professor proceeded, by the aid of certain simple models, to illustrate the mechanical process for obtaining a plane surface in any material, particularly by the circular saw, and the planing-machine. In the latter he illustrated ingeniously the different methods of regulating the motion which brought the work in contact with the tool, a matter of the greatest importance to the result. Some of these applications were shown in the Exhibition by Mr. Whitworth. The shaping-machine was also described, and its action shown, as also the slotting-machine, Brunel's morticing-machine, and other modern inventions.

WORDS TO WORKMEN.*

No sensible person of the working (or any other) classes will envy the higher ranks the enjoyment of luxuries—champagne and the like; things which the best men of all ages have been without, many by even premeditation, and the awe of the deleterious effects of stimulants, &c. Neither can we begrudge the higher ranks their exemption from toil and labour—an assumption only gratuitous and exceptional, because who ever eats his bread more in the sweat of his brow than the wealthy or noble sportsman?—the traveller for science or art sake in distant climes?—the overworked and fagging (*erschöpfte*) statesman and financier? Or shall we envy them their spacious dwellings, knowing that Goethe (though not poor) mostly lived in one room, in which there was no sofa, and reposed in a small iron-framed bedstead? Or shall we envy them the slakeness and tidiness of their occupation, which they often perform without "wetting their feet?" This preference also will, on closer examination, be found illusory, considering, for instance, the dire occupation of medical men, work so ominous, both physically and morally, that we will not dwell on it any further.

What working men may really envy the higher ranks for is, then, the quiet and orderly way in which they (mostly!) perform their work; the quiet and comfort, in fine, they enjoy after that work is done. Both, we say, are at the command of the working men of the present time, if they choose to think, to reflect, and to act judiciously and prudently—essential attributes, after all, of humanity; and any one, in fact, who does not possess them, places himself forcibly out of that pale he still wills or means to reach. First, then, every person ought really to possess that qualification (profession) he eventually professes to be capable of. Do you wish to obtain the reward (wages) of skilled men? Be such, and then the world will belong to the courageous (*Die Welt gohört dem Muthigen*). We do not speak of that dogged courage of the battle-field, but that energy of life and exertion to which, after all, we repeat, the world belongs. Will you possess the external rewards of the higher ranks of society; take them at once,—by acquiring their internal stamina and impulses. Act judiciously, prudently, and with skill, and you will surely be raised, because it is a curious observation, that men (mostly) soon cease to do that work they perfectly and eminently are able to perform, and rise to that which is above it!! Of course, this has its limits, the centripetal force controls the expansive one, and wisely ordained it is.

But let us reflect on the quiet and comfort the higher classes enjoy in their leisure hours at home; and so can the thinking human-like (*menschliche*) workman. It is not the range of rooms we may occupy which makes man happy, but the comfort of that one or two he actually uses and dwells in. That regularity, tidiness, systematicity which a sensible man displays in his work, he mostly transfers and conveys home. Clever men of all ranks have done wonders also in this respect. When the chemist Scheele had become famous all over the world, and visitors were anxious to see his laboratory, where he had made such great discoveries, he led them to a few shelves and cupboards of his room, a few furnaces placed outside the windows, when and wherewith all these grand things had been accomplished—all orderly, all tending and arranged for one purpose and end. The dwellings of the industrious classes have, of late, become matter of States' attention in most parts of Europe. If working men will have respect for their places of abode, they will not hire any human-unworthy (*menschen-unwürdige*) habitation. Surely architects and landlords will soon become aware and alive to that; and so also may be the internal arrangement of their dwellings, —"the luxury of order, cleanliness, tidiness," &c. To conclude, the man who will prosper in life, must make himself capable of being prosperous.

* Translated from the German,—"A New Year's Gift to the Working Men of Europe."

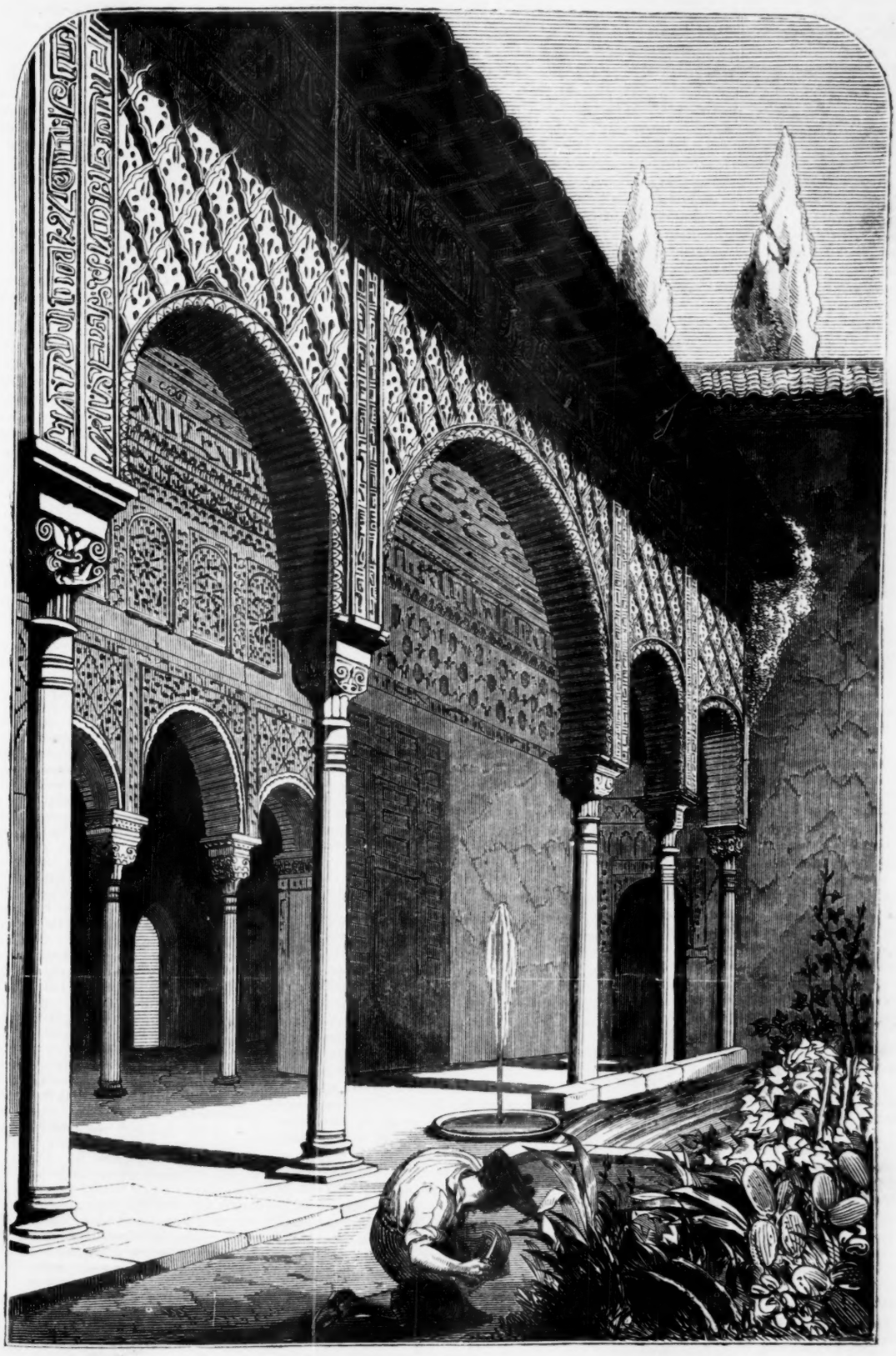
FOREIGN ARCHITECTURAL AND ARTISTICAL INTELLIGENCE.

The Petersburg and Warsaw Railroad.—The Russian Government have decided on completing these huge works even in a shorter time than was originally proposed. Hence, therefore, the line has been divided into eight sections, which will be separately under an especial direction, for thus expediting the works as much as possible. In imitation of the Romans, the earth-works are to be executed by the soldiery of two separate *corps d'armée*, by which a great saving of wages will be achieved. A space of nearly three years is now assigned for the completion of this hugest European line. That between Warsaw and Moscow is also to be put into immediate execution, also assisted by the labours of the soldiery. It is a question, however, unresolved yet, whether the intense cold of these regions (at times 25 degrees Réaumur below the freezing point) may not affect, by too great a contraction of the iron in the machinery, and even the rails, the regular traffic during the winter months.

Glass Palace on the Continent.—The committee of management for the Silesian Industrial Exhibition, to be held this year at Breslau, have decided that a building similar to the London Glass Palace should be erected for that purpose. It will occupy a superficial area of 25,000 square feet, but be covered with slate, on account of the northern latitude, and as it will be probably kept for other ulterior purposes. The contractors will erect the building quite at their own risk, but receive 12,500 thalers for its present use, which will have to be obtained by the admission fees.

Brussels Academy of Fine Arts.—M. de Nievekerke has published a new set of regulations for the fine art exhibition, to be held this year in the Belgian capital. No one person can exhibit more than *three* articles, these being considered quite sufficient for the ambition or gain of any one artist. The committee on the adjudication of prizes to consist henceforth of one-half elected by the artists, and the other half by the academy. No member of the academy nor any person *decorated* can take part in these exhibitions, destined to encourage and raise nascent talent. An additional prize of 4,000 francs has been added by the minister of public instruction. —— A paper by Mr. W. P. Griffith, "On the Proportions employed by the Romans in forming the Temple of Vesta, at Tivoli," has been read before the class for the Fine Arts in the Royal Academy of Belgium. It was referred to M. C. Bock, M. Baron, and M. Roelandt, who have drawn up lengthy reports upon it.

Lecture by Mr. Macready.—A lecture on poetry was given on Wednesday in week before last, by Mr. W. C. Macready, at Sherborne-house, to the members of the Sherborne Literary Institution, of which he is president.



THE ARCADE OF THE GENERALIFE, SPAIN.

THE GENERALIFE, NEAR GRANADA.

THIS drawing is a view of the Arcade of the Generalife, a summer palace built by the Moors about a mile out of Granada. Its architecture is of a graceful character, and its present warm cream-like tint adds vastly to its charm—a charm ruined by the use of gold, red, and blue, as exemplified by the restorations now going on at the Alhambra. This palace is likewise remarkable for the most exquisite gardens which, by means of an ingenious irrigation, enjoy a perpetual summer. It is now, though the property of a noble family, in a state of decay and desertion. The accompanying illustration is from a drawing made for us on the spot.

TAXES ON PRUDENCE.

SIR,—I hold a situation in an eminent London Fire Assurance office, and am forcibly struck with the injurious effect of the duty and charge for the policy stamp.

A working man entered the office the other day, and inquired what was the charge made by the society for assuring 100*l.* on personal effects and furniture. The answer was, "One shilling and sixpence, if a brick-built house." "And is that all? Why, I thought it cost a deal more than that. Five or six shillings, at the least." Upon this it was explained that though the charge made by the company for the assurance of 100*l.* was only 1s. 6d., the *cost* of effecting such assurance was really 5s. 6d. This naturally led him to ask how that could be; and I leave you to judge of the perplexity of the honest man, when informed that the Government duty was 3s., and the policy stamp 1s.!! Finding this sum beyond his means, he thanked us for our civility in explaining the matter, but regretted to say he must remain as he had hitherto been—uninsured.

Such barriers to the extension of prudence ought surely to be removed, and encouragement held out by Government to all who desire to play the important part of self-helpers in the great social drama.

AN INSURANCE CLERK.

THE ASSESSMENT OF THE HOUSE-TAX.

THE principles of the assessment of dwelling-houses, tenements, and all other hereditaments, however correctly defined by the Legislature, or expounded and further illustrated by the decisions of the Court of Queen's Bench, in their relation to the assessment of beneficial occupations generally to the house-tax, now involve an anomaly, and therefore a complexity of adaptation in the latter case, to which public attention may be rightly directed. The house-tax can be taken either upon the returns under the property-tax, or upon the actual rental returned by the tenant. This actual rental may be received from various tenures; viz., from tenancy commonly called "by will," or more properly from year to year, or on lease, &c. If on lease, the actual rental may include a sum charged to the tenant for goodwill, for the use of fixtures or machinery; in short, for premium in any shape. The question, therefore, arises, should the house-tax be paid upon the amount returned by tenants in possession, upon sometimes arbitrary tenancies, or upon the sum at which such properties may be assessed to the poor-rate, where such assessments are made according to the Parochial Assessment Act? The object of this Act is, that all assessments should "be fair, just, and uniform," and therefore a practical coincidence between the impost of the house-tax and all rates made for the relief of the poor should first be sought to be established, and if so, as rigorously maintained. By thus proceeding, much complexity would be obviated, uniformity might be secured, and each assessment, if correct, would mutually sustain the other, and the determination of the amount rated upon having been fixed before the house-tax came in force, all suspicion of *adjustment* to alleviate the latter effectually removed.

Among many instances of the unjust assessment of the house-tax are chambers and premises attached and belonging to the Temple, Lincoln's-inn, the various other Inns of Court, and all similar occupations. Covent-garden Market, also, is now the subject of much controversy, and these, *cum multis aliis*, present additional illustrations of the unjust, unfair, and unequal pressure of the house-tax, especially where the window-duty has heretofore never been paid. As such instances are of frequent occurrence, not only in the metropolis, but throughout the whole kingdom, the consideration of the subject is a matter of great importance, wherever house property is affected by the impost.

It may not, by way of illustration, be irrelevant to state that in Covent-garden Market each shop, tenement, or occupation, including three public-houses, is held direct from the Duke of Bedford at only weekly rentals, varying from 9s. to 2*l.* 15s. Each tenancy, where chargeable to the house-tax, has been charged by the collector at a sum which is the result of such weekly rental multiplied by the number of weeks in the year, and upon this sum the house-tax is now proposed to be collected. This circumstance has been more noticeable since it is perfectly at variance with the principle of uniform rating, and which principle one parochial surveyor is represented to have adopted in a survey completed since Christmas last under the direction of the churchwardens, &c., for the purpose of the "rector's-rate."

Should this principle be correct and legal, it hence must follow that all occupations, whether weekly, monthly, or annual, like chambers in the Temple or Inns of Court, or any other similar holdings, where held upon the gross estimated rental of the Parochial Assessment Act, can only be correctly assessed when assessed upon their real or net annual value, which must be at a sum less the proportionate charge of rates, taxes, repairs, and insurance (the "statutable deductions" before mentioned) all of which are necessarily included in the gross sum received by the landlord, and for the amount of such "statutable deductions" (*quasi*) paid by the tenant, he is unjustly charged when so charged to the house-duty, since these items invariably influence a tenancy, and therefore, when deducted, show the "annual rateable value from year to year," upon which the house-duty ought only to be paid. Now, the objection to the adoption of the poor-rate is the want of uniformity which pervades parishes in "union," as it is termed, with each other, and also those contiguous in the same county inasmuch as the data of assessment in one parish may be high as according to the Parochial Assessment Act, or net annual value; whereas in another it may be the reverse, and only the result of addition to or alteration of a general assessment, made so long since that no traces of its record can be found in archives of such parish. To wit, adjacent to Covent-garden Market is the parish of St. Martin, which was surveyed for the purposes of parochial assessment by Mr. Cantwell, wherein the high standard was adopted. Immediately after the survey of St. Martin's in the Strand Union, the parish of St. Paul was surveyed by Mr. Paine, who about ten years ago also surveyed the parish of St. Clement, which abuts on the Temple, and comprises New Inn, St. Clement's Inn, and a large portion of Lincoln's Inn; in which latter class single rooms or suites of rooms, or chambers, are proposed to be assessed, like the Temple and Covent-garden Market, to the house-tax upon the *gross estimated rental*, instead of *real* annual value. As chambers in Lincoln's Inn in some cases realize upwards of 300*l.* a-year, the subject becomes of the greatest importance. The anomalies presented by a comparison of poor-rate with property-tax, or house-tax returns is a serious and existing evil, which legislative enactment alone can remedy. Nevertheless, the assessment of the house-tax upon *gross estimated rental*, as herein set forth, can always be proved to be in contravention of the Parochial Assessment Act, which an appeal to the commissioners will most probably mitigate or effectually remedy.

SCULPTURED STONES IN THE NORTH.

THE Spalding Club are commendably engaged in the preservation of authentic records of the many curious and extremely ancient sculptures on stones in the north of Scotland. Drawings and lithographs have already been collected relative to fifty of them. At a recent meeting, the secretary, Mr. Stuart, stated that he had transmitted a copy of the engraving of one of these stones—that at Newton, in Garioch—to Lieutenant-colonel Sykes, who took the trouble to obtain the report of Mr. Norris, one of the secretaries of the Royal Asiatic Society. They concurred in opinion that about ten of the characters of the inscription were absolutely identical with those of the ancient Lat alphabet of the Buddhists, one of the oldest Brahminical alphabets in India!

It is said to be a curious circumstance that a greater number of the ancient vegetable and animal accompaniments of civilized life are to be found concentred in Thibet, the seat of the Buddhist pope or god—the Llama—than elsewhere throughout the known world, and it may hence be reasonably concluded that Thibet was a common centre whence they were distributed, probably along with some emigrant races, throughout the continents of Europe and Asia and their adjacent isles. A recent writer has hit upon an idea closely akin to this in the suggestion, which he works out, that a great exodus of Buddhists took place from India, by Affganistan, when the Brahminical sect overcame the Buddhistical, and that the expelled sect colonized Greece, Italy, Egypt, &c., by Buddhist propaganda, who spoke of the empire whence they came, we presume, as a *celestial* one, as well as of their Llama as its supreme *god*, Zeus, or Jupiter. It will, therefore, bear curiously on such ideas, if it be found that there are Buddhist traces in the extreme antiquity even of our own little "isle of the sea."

At the meeting alluded to, Mr. Thomson, of Banchory, remarked, that "Recent researches made it more than probable that the uncouth figures upon these stones spoke a language which might yet be deciphered and read—as had been the case with the hieroglyphics of Egypt and Mexico, and the nail-headed characters of Persepolis and Nineveh. The Spalding Club, therefore, could confer no higher boon on our ancient history and literature, than by securing correct and faithful representations of these monuments, for the purpose of study, by accomplished scholars, both at home and in foreign countries. Many of these stones were already known to exist, but many others might probably be discovered when once public attention was directed to them, and nothing was more likely to have this effect than the publication of engravings by the club."

DISCOUNT FROM TRADESMEN.

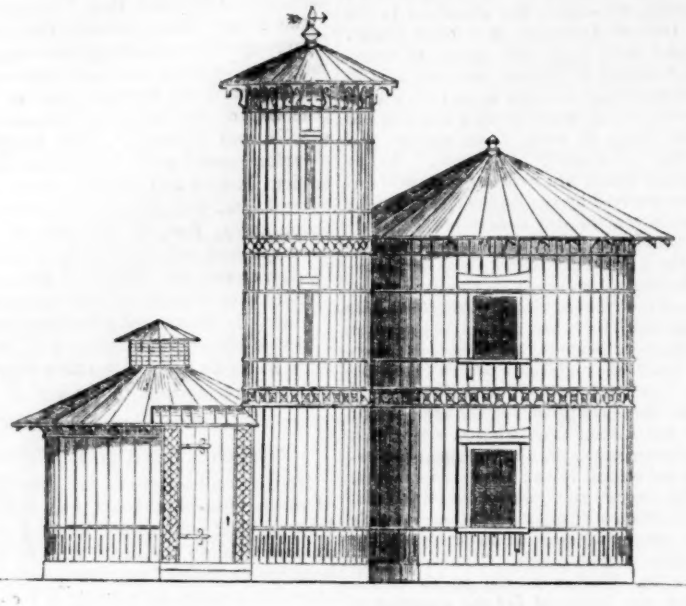
KNOWING how much you have the honour of our profession at heart, and believing that I speak your sentiments when I express my opinion that an architect can only hold the honourable and independent position which he ought to possess, by placing his conduct and actions above suspicion, and which he *must* hold, to do his duty to his employer and to the contractor employed under his superintendence,—for that he has duties and responsibilities to both, I think few will question,—I can hardly doubt that the inclosed advertisement, published in a weekly paper of respectability and considerable circulation, will give you as much pain, and cause as much indignation with you, and with the majority at least of the profession, as it did with myself. The advertisement in question is from a dealer in stoves, who, in giving reasons for being able to sell so much cheaper than other persons, says:—

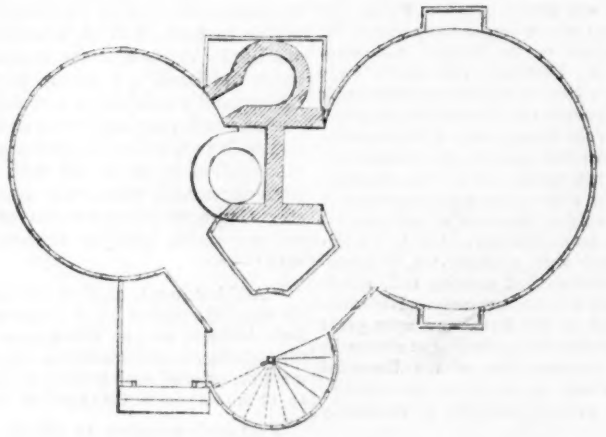
"And last, not least, from the non-allowance of the *usual* discount of 10 or 15 per cent. to *architects*, builders, &c., on the amount of goods sold through their recommendation, by which arrangement the price of such goods is of course enhanced to, at the very least, the extent of the discount."

That such practices as are here referred to once unhappily were in vogue in our profession, and that much of the suspicion that even still is felt by many towards architects was very properly the effect of such practices, is but too well known, but that the disgraceful custom of defrauding an employer, for it can be called nothing else, in the mode alluded to in the advertisement, was still so much a matter of custom, as to allow so business-like an allusion to it as is here found, I was not prepared to suppose, and can hardly still believe, more especially when I remember the perfect incredulity with which an allusion to its being still partially in practice was received some months since at a meeting of the Institute of British Architects by some of the heads of the Profession. I cannot therefore doubt that you will feel yourself empowered, in the name of architects generally, indignantly to disclaim the justice of so foul a blot being thrown upon our fame and honour as a profession of gentlemen, that the advertisers may learn that architects who could lend themselves to practices so unprofessional, and destructive of all confidence from employers, would be scouted by those who love their art and feel a pleasure in considering that its practice is at once a mark of a gentleman and a man of honour. A YOUNG ARCHITECT.

UNROLLING OF THE BODY FOUND IN ST. STEPHEN'S CHAPEL.—A number of gentlemen assembled on Saturday last for the purpose of examining the body enveloped in a cerecloth or sack in the north wall of St. Stephen's Chapel; but no record, document, or any thing else of interest was found besides the crook already described. It was generally agreed, however, that the body was that of Lydwolfe, Bishop of St. David's, and, therefore, of about the date we suggested, namely, the middle of the 15th century.

TUB HOUSES. PLAN AND ELEVATION.





TUB HOUSES.

A patent has been granted to Mr. George Tate for the construction of houses and other buildings by fitting together staves, or other pieces of timber, secured together by hoops or binders, and fixed by any suitable method practised by builders, either vertically or horizontally, at any height, upon piles, sleepers, or frames, securely fastened in the ground; the joints of the pieces or staves, when necessary, being bevilled as required, and wrought either plane or rounded, and hollowed or dovetailed, or tongued and grooved, or glued up or caulked, or merely drawn close together by the hoops. In the construction of buildings of greater height than the length of the staves or pieces employed, the horizontal jointings are to be made to break joint with each other. Such houses, he says, may be formed one within the other, so as to leave spaces between.

The floors, roofs, and partitions are to be formed on the same principle as the shell part of the building, that is, by tightly wedging up staves or pieces of timber, or other material of short lengths, according to the depth of the floor, roof, &c., in concentric rows, within an external hoop or other binder, and running the interstices solid with glue or other viscous and siccative matter, mixed or not with earthy or mineral matter.

The pieces may be dyed, or stained, or moulded, so as to form patterns, and to be trennailed or fastened together if necessary. The walls, whether internal or external, the inventor states, may be ornamented by the crystals of salts being deposited in the usual way on glass, and then fastened to the walls by applying glue or cement at the back.

The annexed engraving exhibits a dwelling complete, constructed according to this invention. The hoops or fasteners, he says, should be so arranged as not to interfere with the openings required, such as doors and windows, and the staves or pieces and hoops may be painted or otherwise preserved from decay.

We have given these particulars for the novelty of the thing. The patentee sets forth that the object of his invention is to afford the working classes "cheaper and better accommodation than heretofore," and doubtless he is able to point to circumstances under which the proposed arrangement would be found useful. For our own part, however, we have no desire to see the exclusive right of dwelling in a tub, long possessed by Diogenes, interfered with, and would rather aid in obtaining for the working classes habitations of a more durable and less combustible character. A joker at our elbow suggests that the proper inscription for such a structure (built literally to "stave off" the weather) would be, "This is a house, all Butt."

Steam-Engine Improvements.—Mr. J. Hick, of Bolton-le-Moors, engineer, has just patented some improvements in steam-boilers or generators, which consist in the arrangement of two boilers, end to end, with an intermediate space or gas chamber, two of the sides of which are formed by the ends of the two boilers, while the other sides are constructed or lined with brick or some other slow conductor of heat. Mr. Hick claims the arrangement of two or more steam-boilers or generators with a gas-chamber formed or lined, and situated as described, for effecting a more perfect combustion of the products of the fuel.

OPENING OF THE VICTORIA TOWER, WESTMINSTER.

On Tuesday, February 3, Queen Victoria, for the first time, entered the New Palace of Westminster by way of the Victoria Tower. In the evening the line from Old Palace Yard to the Great Tower presented a very gay and imposing appearance, especially from the new entrance called St. Stephen's Porch, southward, the whole of the new buildings being brilliantly illuminated, including the large storied window at the end of Westminster Hall (or, more properly, which flanks St. Stephen's Porch), and the Great *Porte Cochère*, formed by the Victoria Tower, in each corner of which was a lofty standard gas light enclosed in a lantern. The lights outside the windows of the House of Lords were, of course, in use, converting the rich stained-glass windows into transparencies—a novel and happy idea, which we have every reason to believe was first proposed in our pages. In reply to some inquirers: so far as we know, the Tower is intended to be continued of its present plan, square, with octagonal angle turrets, to the top. The ultimate design of the upper part is not yet fully determined. The present height we believe to be about 160 feet from the ground.

THE SOCIETY OF ARTS' PRIZE COLOUR BOX AND CASE OF INSTRUMENTS.

There has been a strong competition, it appears, amongst British and foreign colourmen and instrument makers for the prizes offered by the Society of Arts, and the consequent profits of the sale to the public of the selected articles. The quality of the articles in general is really surprising, considering the prices. The committee, however, had to guard against the motives, in some cases, to the production of such excellence, inasmuch as the award of the prize might mainly be striven for as an advertisement to forward the general interests of the manufacturer, without much practical or permanent benefit to the public. The Society, however, will enter into stringent arrangements with the successful candidates for the unlimited public supply of articles fully up to the mark of the prize specimen. They have not yet decided on the successful candidate for their approbation in the manufacture and sale of instruments; but that the offer of a prize in the circumstances will lead to the adoption of sets of instruments of remarkable cheapness, the display on the Society's tables sufficiently assures us. The committee may be said to have decided as to the colour-box, having chosen Mr. Rodgers as the recipient of the silver medal offered for the best that can be made for one shilling; but the award is not yet published, as the committee have remitted the prize specimen to Mr. Rodgers for some minor modifications.

Notices of Books.

A New Gazetteer or Topographical Dictionary of the British Islands and Narrow Seas, comprising concise descriptions of about sixty thousand places, seats, natural features, and objects of note, founded upon the best authorities; full particulars of the boundaries, registered electors, &c. of the parliamentary boroughs; with a reference under every name to the Sheet of the Ordnance Survey as far as completed, and an Appendix, &c. By James A. Sharp, Esq. Part I. Also complete in Two Vols. London: Longman, Brown, Green, and Longmans. 1852.

The main objects of this work appear to have been to include as many headings as possible, with a small type and numerous abbreviations, in a compass as small as possible. To these very useful objects everything else is sacrificed,—perhaps, in these days of railway ramifications, and of local guides and other topographical and geographical publications, very properly so. A gazetteer may now very fairly be limited in its uses to mere reference, as an indicial skeleton to all that is most practically useful or interesting as to any one locality; and to this end we may say that we have never seen anything like this new work, although

many such have passed through our hands. The compiler has gone the right way to work in the production of this compendium. He has taken everything he required from the best of previous authorities, as he frankly admits; and, thus standing on the labours of previous compilers, he could not but well accomplish his end of extracting the quintessence of each, and, with industry and intense condensation, combining the results of their labours into one focus,—at a sacrifice of many of the excellencies of each assuredly, but with an immense accumulation of their varied stores. Most especially of all we can perceive that this author has made good use of the idea first embodied in the Parliamentary Gazetteer of England and Wales, published by Fullarton, of ransacking all sorts of Parliamentary blue books for valuable statistics of every kind connected with the localities described; and the dissection of the ordnance surveys may be regarded as a suggestion based on the same idea: indeed, the author acknowledges his obligations to the work in question in a general way, as well as to Lewis, Chambers, Carlisle, and other "general writers," as "the best authorities." He has also made good use of the multitude of special guide-books. In thus acknowledging the general merits of this work, however, we take it for granted that the author has carried his plan throughout quite up to the mark of the portion which is now before us.

Painters, Grainers, and Writers' Assistant. By E. BARBER, Patentee of the Granite and Graining Machine. Elliott, New Oxford-street. 1852.

THIS *brochure* consists of a number of receipts and instructions for mixing various colours, imitating woods, &c. A correspondent from Jersey asks us to give him "the ingredients (and the proportion in which they are to be mixed) for tinting ceilings of a clear and delicate French grey." The book we are mentioning says of the colour in question,—"Whiting predominates in this colour; it is treated as the other greys, but with this difference, that it admits of lake instead of black. Take the quantity of whiting necessary, and soak it in water; then add Prussian blue and lake which has been finely ground in water. The quantity of each colour should, of course, be proportioned to the warmth of colour required." A superior colour, we think, could be made from French ultra marine, and a very small quantity of Indian red. If lake be used, a little yellow would be useful.

SERIALS.

The Journal of Design (Chapman and Hall), is brought to a close with the present number, which completes the 6th volume of its useful career. It contains many valuable essays on the principles of design, and will continue to be a book of reference. A writer in the present number bears testimony to the value of the drawing classes at the London Mechanics' Institution.

The Journal of Physical Regeneration. (Gilpin.) No. I. This purports to be "a monthly epitome of public health." Sanitary measures on the part of its conductors will be needed if long life be desired. The present part is weakly in constitution.

Curiosities of Industry. (C. Knight.) The fifth part of Mr. Geo. Dodd's very interesting work treats of the modern varieties of printing, and a contrast between cotton and flax *apropos* of the Claussen process. The writer gives the following description of Messrs. Marshall's flax mill at Leeds:—

"Instead of having several stories, tiers, or floors, one above another, as is usually the case, the whole is here thrown upon one floor—to insure convenience of supervision, facility of access, uniform temperature, good ventilation, and simplicity of machine arrangements. This monster room is nearly 400 feet long, by more than 200 broad: it is five times as large as Westminster Hall; and, until the Crystal Palace was built, this Leeds room was deemed the largest (or nearly so) in the world. The room has a vaulted ceiling, formed of about seventy domes, having skylights at their upper extremities, and being supported by iron pillars. These pillars, as at the Crystal Palace, serve also as water-pipes, to convey the drainage from the roof. The roof, presenting an area of nearly two acres, was a few years ago covered with mould and grass, so that one could literally take a walk in a green field on the roof of a factory: whether this arrangement is still maintained, we are not aware. The interior of the room is filled with beautiful machinery, for performing all the various operations on flax; and beneath are vaulted passages, which contain all the arrangements for supplying steam power, warmth, and ventilation to the hive of busy operatives working above. It is certainly a triumph of engineering and mechanical skill, when such a building is filled with the finest machines which modern ingenuity can produce. How much mind, how much capital, how much labour must have been thrown into such an assemblage! How do we here trace the accumulation of many years' experience—the bringing to bear upon one object of so many distinct agencies and sources of power, mental and material, social and commercial!"

Cyclopædia of Useful Arts. (George Virtue.) Part VI. brings us up to "Candle,"—a good omen for the light that is to be thrown on all things and ways by Mr. Tomlinson. The article "Bridge" contains a full exposition of the Britannia Tubes.

Miscellanea.

BUILDERS' BENEVOLENT INSTITUTION.—The annual ball of the above useful charity, to be held at Willis's Rooms, St. James's, on Thursday, the 19th inst., under the patronage of the president, Mr. Thomas Grissell, F.S.A., Lord Dudley Stuart, M.P., Sir Benjamin Hall, Bart. M.P., Mr. Alderman W. Cubitt, M.P., and other influential gentlemen, promises to be on a scale of completeness that cannot but ensure approval. We trust the public will not be slow to patronise this valuable and deserving charity which has afforded relief to many decayed members of the trade, and to encourage the officers of it in their endeavours to extend its benefits. We have also the gratification of announcing that another election of pensioners will take place in the month of May next; and that the directors have recently made a bye-law empowering them to appoint distinct committees in the provinces, thus extending the benefits of the institution to all parts of the kingdom.

RUGBY WATER-SUPPLY AND DRAINAGE.—On Saturday week the new works of water-supply and drainage under the Public Health Act, for the sanitary improvement of the town of Rugby, were inspected by the Commissioners of the General Board of Health. The Earl of Shaftesbury, Mr. Chadwick, and Dr. Southwood Smith, attended by some officers of the General Board, visited the works. The most conspicuous of these is a high water-tower, containing a tank to supply the town during Sunday, or in case of fire, or in the night, and to give pressure in the distribution of the water, and avoid the necessity for continuous pumping. The next work inspected was an under-ground reservoir, covered with groined arches. A portion, yet unclosed, of the cuttings of drains for the collection of the water was then visited. Deep drains have been cut into gravel, and the water may be drawn off at will, as from a reservoir, for the supply of the town. The property of the water, in respect of hardness, was said to be equal to eight degrees, while that of the existing town wells varies from sixteen to twenty and even thirty degrees, and that of the streams in the neighbourhood is generally of eighteen degrees. The length of main collecting pipage now laid is 2¾ miles. The drainage works were afterwards inspected. The sewers are of impermeable stoneware tubes. In several cottages the cesspools had been filled up, and a water-closet apparatus substituted. The water service-pipes are of tin. The average expense of improvements for each cottage, it is estimated, might be repaid in the shape of a private improvement rate of about ¾d. a week.

ACCIDENT TO A RAILWAY VIADUCT.—On Friday week part of the trussings at the railway viaduct, Hoo Brook, Kidderminster, was blown down. The damage extends over about five of the abutments, which being placed 51 feet apart, makes a total of between 80 and 90 yards.

BIRMINGHAM NEW WORKHOUSE.—In our article under this head, last week, we stated that by private subscription of the guardians, *the officers of the workhouse*, and the contractors, three stained glass windows had been placed in the chancel and aisle of the chapel. We are asked to say, however, that the subscriptions were by no means limited to the officers of the workhouse, four only of whom,—namely, the late master and his clerk, the matron, and surgeon contributed; whereas, among the officers generally who subscribed, and some of them rather largely, to the fund, were, the clerk to the board of guardians, the treasurer, the district auditor, the six district medical officers, the several officers of the infant poor asylum, the four relieving officers, the out-relief pay-clerk, the levy clerk, assistant overseers, and collectors, four in number, and other officers, none of whom come under the denomination of "officers of the workhouse," and to whose willing and liberal aid in promoting the object in question it is only an act of justice to record the fact we now place before our readers.

LIVERPOOL ARCHITECTURAL SOCIETY.—The usual fortnightly meeting of this society was held on Wednesday, 28th ult., Mr. Picton in the chair. Mr. F. Howard exhibited five drawings of candelabra, which he had executed for the Goldsmiths' Company in London. These designs were each adapted to a particular cost, the highest of which was calculated at 3,000*l.*, and the principal subject of which was Richard II. granting the charter of incorporation.—The Ventilation of St. George's Hall was explained by Mr. M'Kenzie, who exhibited, by a drawing, the whole machinery by which that extensive building is supplied with cold and hot air. The chairman said that the working of the whole affair would be very expensive. A discussion followed, in the course of which it was stated by Mr. M'Kenzie that it required a week to get up the proper temperature.

STATISTICS OF STRIKES.—In 1836, the operatives of Preston, to the number of 8,000, struck work for thirteen weeks, and the loss, in a mere monetary point of view, to the town and trade of Preston was calculated at no less a sum than 107,196*l.*, whilst from twenty to thirty thousand individuals were reduced at once to a state of starvation. In the same year the cotton-spinners of Glasgow struck for a period of seventeen weeks. The total loss to Glasgow amounted to 194,550*l.* In 1834, the result of the combination of colliers in Lanarkshire and the two adjoining counties, was equivalent to a tax on the inhabitants of 489,000*l.* for a period of eighteen months, besides a loss to the colliers themselves, their employers, and others, during a strike of six months, of 189,000*l.* In this strike it is also calculated that between forty and fifty thousand human beings were rendered destitute.—*Liverpool Mercury.*

PROVINCIAL SCHOOLS OF DESIGN.—On Monday week a general meeting of subscribers to the Norwich School of Design was held, when it was resolved to appoint a new working committee, five to be a quorum, and the three who had attended the least number of times to go out at the end of the year and not be re-eligible. The school now comprises 83 students, and is on the increase.——A movement has begun amongst the operatives at Wolverhampton, for the purpose of contributing towards the establishment of a school of design in that district. A preliminary meeting was held on Friday week, when various appropriate arrangements were made to forward the object in view.——The annual meeting of the Manchester school was held on Wednesday week, Mr. J. Brotherton, M.P., the president, in the chair, when the usual reports were read, and the meeting was addressed by various speakers. The report of the head master, Mr. J. A. Hammersley, states that there has been a slight increase in the number of pupils, an inconvenience to too small a staff of teachers.——A movement is being originated at Bradford in favour of the scheme for the establishment of elementary drawing and modelling schools for artisans.

PARTIAL DESTRUCTION OF THE WHITEHAVEN JUNCTION RAILWAY.—A serious injury was done to the Whitehaven Junction Railway on Saturday week, when the sea washed down a high strong wall, and rushing over the embankment, tore up the rails to the extent of some 30 or 40 yards, and also destroyed the wall which protected the other side.

A LENDING LIBRARY OF DESIGN.—The committee of the Suburban Artisan Schools have commenced the formation of a lending library of works on design for the use of the students. Any assistance that can be given, by subscriptions for the purchase of books, or by the gift of books and works of art, will be very thankfully received.

PORTLAND BREAKWATER.—A correspondent from Portland, in explaining the present state of the works there, informs us that they are now carried out to a length of 1,750 feet from the shore line (not 7,750) out of 7,900 feet, the entire length to be executed. The engineer in chief, as we think we have before stated, is Mr. J. M. Rendel, F.R.S.

EXTRAMURAL INTERMENT.—Deputations from the parishes of Marylebone and St. Pancras waited on Lord John Russell last Saturday at the Treasury, for the purpose of suggesting arrangements advisable for carrying out some measure in favour of extramural interments. In his reply Lord John stated that he had instructed Lord Seymour to prepare a measure and carry out its details on the general principles on which they were all agreed; and that so far from its being the object of the Government to have any control in such matters, they had quite enough to do already, and had no wish to be incumbered with more.

BANK CELLARS.—The Directors of the Bank of France have just had constructed extensive cellars, the masonry of which is 9 ft. in thickness. These cellars, which, at the slightest alarm, it is said, may be immediately filled with water, are intended to receive the immense mass of gold and silver, both in coins and bars, which forms the reserve of the Bank.

[ADVERTISEMENT.]

TO BUILDERS.

BUILDERS, and those connected therewith, are dependant upon their own personal exertions for their subsistence. If health fails, they fall into distress; if they die, their families are unprovided for.

The uncertainty of their income often prevents them from making provision for infirmity, old age, or death, by the usual method of assurance.

To meet this difficulty, *The Law Property Assurance Society* has made the following arrangements for the benefit of the profession:—

1. It grants special policies of assurance, by which the assured, instead of being obliged to pay a fixed sum every year, or forfeit their policies, may pay any sum they please at any time according to their means, and for which a proportionate sum will be assured to them by their policy. By this means uncertainty of income is provided for, and no forfeiture for nonpayment ever takes place.

2. If the assurer in this office should find that the objects of his insurance after death are no longer required, he may convert his policy into an annuity for his own life.

3. On payment of a small annual sum during their own lives, husbands may secure annuities for their wives or daughters after their own decease.

4. On payment of a small sum annually, professional men may secure for themselves an annuity to commence on the decline of life, or earlier should they be at any time disabled by sickness or infirmity from pursuing their occupations.

Detailed prospectuses, forms of proposal, and every information will be immediately furnished on application to WILLIAM NEISON, Actuary and Secretary, 30, Essex-street, Strand, London.

[ADVERTISEMENT.]

IRON BRIDGES AND PIERS.

DREDGE'S taper balance, on tension, in small bridges, with the same weight of iron, is three times the strength of the common principle, and this advantage rapidly increases to ten, twenty, and forty times, and so on, as bridges are increased in span; and in point of safety and inflexibility, it is equally superior. Dredge's taper balance girder possesses the same relative advantages over the common girder bridge.—JAMES DREDGE, Bath.

TO THE LADIES OF THE KINGDOM AND THOSE UNLEARNED IN ARCHITECTURE.—We propose to commence, in the next number of THE BUILDER, and to continue until completed, a popular sketch of the history of architecture from the earliest times to the present day, in the shape of a series of Letters to a Lady, giving the characteristics and dates of the various styles, with occasional illustrations, references to existing examples, and brief notices of eminent structure-raisers. Our object will be to make these letters interesting and amusing as well as instructive, and to give a stock of useful knowledge in a pleasant form to some who would be otherwise deterred from acquiring it.

TO CORRESPONDENTS.

"New Buildings Act: Referees, &c." (we have several items of information on these heads in type, but postpone them for reasons) "J. M.," "C. B.," "J. C." "E. S." (thanks), "F. C. P.," "G. W." (is the society in operation? Have any houses been built?) "F. R.," "W. F." (we are sorry we cannot usefully advise), "J. T." (we will look in), "F. L.," "J. A. G.," "T. J. H." (declined, with thanks), "A. P.," "J. B.," "L. C. M.," "G. R. L." (an eaves-tile to form gutter has already been made. The proposed arrangement for keeping out the water is imperfect), "T. G." (the epitaph sent has been often printed), "F. S." (ditto), "A. B.," Bristol (apply to a competent architect), "F. S.," "A. B.," (under the circumstances we should trap each pipe), "T. C," "G. R.," "G. J. R.," "R. F.," "W. G. E.," "A. G. H.," "W. W." (see present number for reply), "Two Readers" (ditto), "A. E. H.," "S. C.," "J. C.," "An Old Subscriber" (it depends on circumstances; but it will be safer to trap each pipe), "T. N.," "C. H.," "R. J."

ERRATUM.—In report of a recent trial, Mr. Lett was erroneously described by plaintiff's attorney as "district" surveyor.

ADVERTISEMENTS.

THE LATE FIRE at Messrs. COLLARD'S. The official return of the recent fire at this eminent establishment shows that, in addition to the large amount of property destroyed belonging to the firm, the working tools of their men have been likewise sacrificed. It appears, also, from the proceedings of a public meeting held for raising subscriptions to meet the heavy losses sustained by the workmen, that they were wholly uninsured. With the hope of preventing a similar calamity, the SCEPTRE LIFE AND FIRE ASSURANCE SOCIETY will grant to the persons employed in the above manufactory, and in all other manufactories throughout the empire, Fire Policies for small sums; and, in order to afford every facility to assurers, will appoint the foremen of such establishments special agents of the Society. Prospectuses, and all other information, may be had of the Managing Director, at the Offices, 27, New Bridge-street, Blackfriars, London.

EVENING LECTURES on ENGINEERING CONSTRUCTION.—For particulars, apply to CHARLES MANBY, Esq., Institution of Civil Engineers, 25, Great George-street; or to Mr. CLEGG, 11, Buckingham-street, Adelphi.

PAINTERS' BRUSHES, manufactured expressly for the use of painters and builders, of the best Russia bristles, warranted. Price list sent post-free on application to the manufacturer, J. B. TYLOR, 29, Great Dover-street, Borough, London. No brushes are genuine unless stamped "J. B. TYLOR, London."

LIGHTERAGE.—To Saw-Mill Proprietors, Timber, Slate, and Stone Merchants, or others, requiring Lighterage.—The Advertiser having a large number of Barges, is willing to undertake LIGHTERAGE at prices that defy competition.—CHARLES STRUTTON, 34, Commercial-road, Lambeth.

TO SAW-MILL PROPRIETORS, CORN AND COAL MERCHANTS, AND CARMEN.

TO BE SOLD, a NEW SPRING VAN, very strong, to carry five ton, well. Patent axles and springs. The owner will take the value out in either of the above trades. Address, E. W., Office of "The Builder," 1, York-street, Covent-garden.

PAPER HANGINGS.—R. HORNE, PAPER-HANGING MANUFACTURER, 41, Gracechurch-street, City, invites builders and the trade to inspect his extensive stock of NEW DESIGNS in PAPER-HANGINGS, which, by the aid of powerful machinery, he is enabled to offer at the following prices, in stock quantities, for cash only, viz.:—

Stout lining paper	5d.	3d Pieces.
Superior ditto	6d. and 7d.	
Bed-room papers, in great variety	at 5d.	
An excellent oak paper	at 8d.	
Sitting-room ditto, on blended grounds	7d. to 9d.	
Hand-made marbles	9d. to 1s. 6d.	
Good satin papers	1s. 6d. to 2s. 0s.	
Flock papers	2s. 0d. to 2s. 6d.	
Hand-made granites	9d. to 1s. 6d.	

Every novelty in French and English panelled decoration always on hand; also excellent imitation of fancy woods.

N.B. Patterns sent into the country, by post, showing the style and quality of the above, on receipt of two stamps, and the goods despatched with promptitude on receipt of a remittance to the amount of the order given.

PAPER HANGINGS, by E. T. ARCHER'S patented Machine, Blocks, Cylinders, and Artistical Labour, at his Manufactory, for all kinds of papers adapted for internal decorations. PANELLED DECORATIONS fitted up on the walls of the extensive Show Rooms, in every known style, and fo all purposes, by artists of known merit.

Always on hand a CHOICE and EXTENSIVE SELECTION of FRENCH PAPERS, from the best manufacturers in Paris.

Attached to the paper-hanging factory there is the choicest assortment of CABINET FURNITURE in London, of the best make, and upholstery goods of the first fabric, Brussels carpet, 2s. 6d. per yard, floor cloths, the best that can be made, cut to any dimensions, 2s. 3d. per yard, silk and worsted curtains, of the finest fabric, 5 feet wide, 3s. per yard, at

E. T. ARCHER'S, 451, Oxford-street.

PAPERHANGINGS.—By recent improvements in block and cylinder printing, good satin and bed-room papers are offered to the trade, at very reduced prices, by JEFFREY, ALLEN, and CO., Kent and Essex-yard, 115, Whitechapel.

PARTNERSHIP.—TO BUILDERS' CARPENTERS and JOINERS.—An active, intelligent and industrious Man, with from 400*l.* to 500*l.* may hear of an excellent opportunity of commencing business in partnership with a builder, cabinet-maker, and upholsterer in the country, with a large, highly respectable, and increasing connection.—Apply to GEO. ENOCH, Esq., Surveyor, Grove-lane, Camberwell.

CLERKS WANTED.—A Ledger Keeper, well drilled in habits of business, civil, and capable of receiving money and of giving private security for 500*l.* Hours usually from nine till six; age between 30 and 30; salary about 80*l.* per annum. Also, a Young Clerk, aged from 17 to 20, also of business-like habits, civil, and capable of receiving money, and of giving private security for 300*l.* Hours from six till six; salary about 30*l.* per annum, according to age, &c. Both will be preferred if used to the business of a gas office.—Application by letter only, with the words "Clerk Application No. 1 or No. 2," (as the case may be), addressed to the Secretary of the Phœnix Gas Company, Bankside, London.

TO WOOD CARVERS.

TWO good Country Workmen, accustomed to Gothic work of the best description, may get EMPLOYMENT, by addressing, pre-paid, stating wages for the country, with full particulars, to D. C., Mr. Beattie's, Gunmaker, 205, Regent-street.

MASON WANTED.—A sober and industrious man, accustomed to all kinds of cemetery work and jobbing, may hear of constant employment near London.—Address, S. A., office of "The Builder," 1, York-street, Covent-garden, in own handwriting, with reference as to character and competency.

WANTED, a Master Builder for a respectable Lad, as an IN-DOOR APPRENTICE.—Address, stating particulars, to B. Y., "Admiral Hawke," Barmondsey.

WANTED, a YOUTH who writes well, and is quick at accounts, in a Carpenter and Builder's Counting-house, where he may have a good opportunity of learning the business.—Apply by letter to J. J., 59, Watling-street, City.

TO BUILDERS' CLERKS.

WANTED, a person in the above capacity in an office in the country.—Application to be made by letter (postpaid) to Mr. WM. SHEARBURN, Surveyor, Dorking, Surrey. N.B. A draughtsman would be preferred.

TO BUILDERS' CLERKS.

WANTED, in the Country, immediately, a steady Young Man, as CLERK to a BUILDER. He must be a good draughtsman; understand taking out quantities, measuring, &c., and be a good builder's accountant, and acquainted with all the varied branches of the building trade.—Address, stating terms, by letter only, to Mr. HENRY WILLIAM BROADBRIDGE, Surveyor, 20, East-place, Kennington-road.

WANTED, by an Architect residing in the country, an experienced DRAUGHTSMAN; one well versed in Gothic architecture and accustomed to making perspective drawings.—Address, stating salary, to Mr. SHARP'S Library, Red Lion-square, Stamford.

WANTED, a CLERK, in a large Retail Timber, Deal, and Mahogany Yard, in London. He must have been accustomed to the trade, write a good hand, and quick at figures. Security will be required.—Address, giving real name, to E. W., Office of "The Builder," 1, York-street, Covent-garden.

TO PARENTS AND GUARDIANS.

WANTED, by a Builder, 5 miles south of London-bridge, TWO OUT-DOOR APPRENTICES, one as a Carpenter and Joiner, the other as a Bricklayer and Plasterer, under the immediate eye of the Master. A small premium in proportion to the wages required.—Direct G. M., Robert Drews, Esq., 63, Coleman-street, City.

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The Art Journal, for March 1849; *Literary Gazette*, of Feb. 3, 1849; *Standard*, Feb. 8, 1849; *Herapath's Railway Journal*, Feb. 10, 1849; *The Tablet*, Feb. 3, 1849; *Ladies' Newspaper*, Feb. 3, 1849; *Railway Chronicle*, Feb. 3, 1849; *Morning Post*, Feb. 16, 1849; *Observer*, Feb. 11, 1849; *Morning Herald*, Feb. 17; *John Bull*, Feb. 10, *St. James's Chronicle*, Feb. 10, 1849; *Historic Times*, Feb. 23; *British Army Despatch*, April 20, 1849; *Mining Journal*, March 17, 1849; *Civil Engineer and Architect*, March 1; *Weekly News*, Feb. 3, 1849; *The Builder*, March 3, 1849; *Journal of Public Health*, March 1, 1849; *Magazine of Science*, for March 1849; *Railway Times*, Feb. 9, 1850.

"The *Pyro-Pneumatic Stove Grate* exhibited by Mr. PIERCE is entitled to high commendation, and its merits may, in many cases, be most usefully employed; there is no question *this Stove is one of the best* that can be used for warming large spaces, such as *churches, schools, public buildings*, &c.—*Illustrated London News*, June 14, 1851.

PIERCE'S ECONOMICAL RADIATING STOVE-GRATES,

WITH ORNAMENTAL HEARTHS AND FENDERS, QUITE UNIQUE, ADAPTED TO THE DECORATIONS OF ANY ROOM FOR WHICH THEY MAY BE DESIRED.

The RADIATING PRINCIPLE, upon which all these Grates are constructed, is that of producing the GREATEST DEGREE OF WARMTH with the LEAST WASTE OF FUEL. The Cleanliness, Comfort, Economy, Prevention of Smoke, and correct style of Architecture, with FIRST-RATE FINISH, has obtained for them the most extensive patronage. The superiority of the RADIATING STOVE-GRATE arises chiefly from the heat being prevented from uselessly diffusing itself; in addition to which, the Fire Lump, being a slow conductor of heat, this important agent is necessarily radiated over the apartment; and it is a remarkable fact attending these Grates, that, when the Fire Lump becomes hot, it retains the heat acquired much longer than any metallic body possibly can do, and consequently imparts warmth to the room for many hours after the fire has been out.

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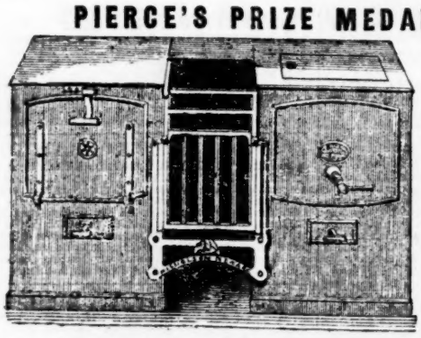

Sketch of the Prize Cottage Range.

NICHOLSON'S PATENT PRIZE COTTAGE RANGES,

LINED THROUGHOUT WITH FIRE LUMPS,

Which have received the Premiums offered and awarded by the Royal Agricultural Society, at their Meetings held at York in 1848, and Exeter in 1850; also of the Great Exhibition, 1851.

This Cottage Range is on a much improved principle, and is constructed with the strictest regard to durability, economy of fuel, and convenience in use, whilst the greatest simplicity has been attained both in its arrangement and manufacture, whereby the cost scarcely exceeds those of the most common description.

The advantages the Prize Cottage Range possesses over the Ranges generally sold, consist in its great economy, superior efficiency, and great durability.

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Which can be used in any Room, or in the open air, without fixing, and is admirably adapted for Emigrants, &c., &c., &c.

Price, with boiler, 75s.; with oven, and no boiler, 55s.

Sketch of the IMPROVED COTTAGER'S GRATE, *for Warming Two Rooms, as recently furnished to the Model Lodging House, erected for* HIS ROYAL HIGHNESS PRINCE ALBERT, *in Hyde Park, adjoining the Cavalry Barracks.*

PIERCE'S UNIVERSAL FIRE-LUMP GRATES,

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IMPROVED COTTAGER'S GRATES,

For which the PRIZE MEDAL was awarded at the GREAT EXHIBITION of 1851, in Hyde Park.

THE IMPROVED COTTAGER'S GRATE, for warming two rooms with only one fire, made of the finest prepared fire-clay, having an air-chamber at the back (from which, by means of a pipe, and the admission of fresh air from the outside), will supply a sufficient degree of healthful warmth to render another room comfortable. This Grate has the additional advantage over the others of a table-bar at the bottom, and a large trivet at the top.

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NOTICES OF THE PUBLIC PRESS.

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"The most economical and very best open grates we have seen are an admirable kind manufactured by Mr. PIERCE, of Jermyn-street. We use them ourselves, and find them faultless."—*Gardener's Chronicle*, edited by Dr. Lindley, Nov. 16, 1850.

See also the *Art-Journal*, for Nov. 1850; *Builder* and *Architect*, for June 1st; *Magazine of Science*, Sept. 1850; *Herapath's Railway Journal*, 28th Sept.; *Journal of Design*, Oct.; *Plymouth and Devonport Journal*, 22nd Aug.; *West of England Conservative*, 11th Sept. 1850, &c. &c. &c.

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